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THE
INDIA DIRECTORY,

For the Guidance of Commanders of

STEAMERS AND SAILING VESSELS.

Founded upon the Work of the late

CAPTAIN JAMES HORSBURGH, F.R.S.

HYDROGRAPHER TO THE HONOURABLE THE EAST INDIA COMPANY.

PART THE FIRST.

CONTAINING

THE EAST INDIES,

AND INTERJACENT PORTS OF

AFRICA AND SOUTH AMERICA.

REVISED, EXTENDED, AND ILLUSTRATED WITH CHARTS

OF

WINDS, CURRENTS, PASSAGES, VARIATION, AND TIDES.

BY

COMMANDER ALFRED DUNDAS TAYLOR, F.R.G.S.,

LATE INDIAN NAVY.



" They that go down to the sea in ships, that do business in great waters, these see the works of the Lord, and his wonders in the deep."
PSALM cvil. 23, 24.

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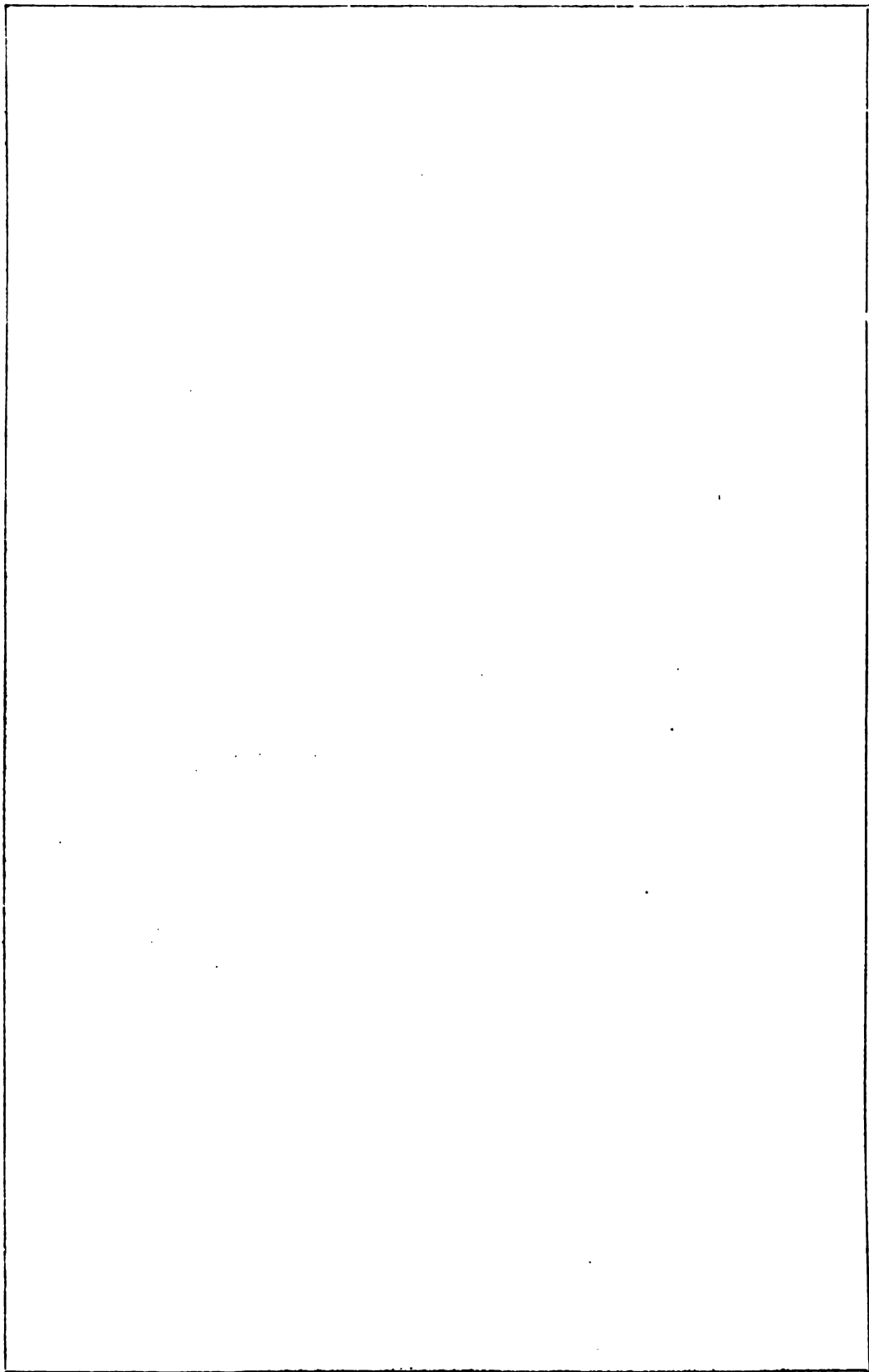
TO THE
RIGHT HONOURABLE
THE SECRETARY OF STATE FOR INDIA IN COUNCIL,

THIS WORK

Is, with Permission, Respectfully Inscribed by

THE AUTHOR.

13, WATERLOO PLACE, S.W., *November, 1878.*



PREFACE.

HYDROGRAPHY is a progressive science and might take for her motto "Line upon line, line upon line; here a little, and there a little." One man's life-time suffices not to accumulate notes of his own experience; therefore such a book as this is necessarily a collation from the remarks of one or two centuries of sailor-pioneers. Those compilers, who cater now-a-days for the nautical public, must be up and doing to provide such food as may satisfy the great and increasing demand. The author's object therefore has been to make as complete an "India Directory" as the present knowledge of Indian Ocean navigation will permit.

The opening of the Suez Canal having completely revolutionised the Ocean traffic of the East Indies, it became necessary to make the First Section of this Book descriptive of the steamer highway through the Mediterranean and Red Seas. This section is brief, but Horsburgh's very useful plan of giving the latitudes and longitudes of places with the description of lights and other landmarks in their geographical sequence, that the mariner may find at a glance all the useful information he needs on his outward bound voyage, has been maintained. Having furnished this missing link to the navigation of our Ocean highway towards the East Indies, the author has made provision for sailing vessels as well as Steamers going out by the Cape of Good Hope Route, being persuaded that sailing vessels are not about to be entirely superseded by steamers in these days of dear coal; persuaded also that an accurate knowledge of Indian monsoons will enable sailing ships to compete successfully on many lines of highway with all but full-powered steamers.

Some description of the entire contour of Africa is given in the Second Section for the first time; that of the East Coast from the Cape of Good Hope to Suez is the most elaborate, but we have yet much to learn of the coast between Natal and Guardafui. For that end we must look to the intelligent officers of the mercantile marine who may commence those trade operations along that coast which are soon likely to follow the abolition of the infamous slave trade. The description of the coasts of Arabia, Persia, and British India, is gleaned from the writings of Captains Haines, Albany Grieve, and Constable, I.N., of Commanders Ward and Heathcote, I.N., and from the author's own West Coast of Hindostan Pilot.

The projection of the Iceberg Chart is novel in a book of this kind, but it shows so much better than Mercator's projection what is the space of sea available for ship traffic to the South of the Cape and Australia.

The author has endeavoured to show the best tracks for steamers in opposite monsoons on two separate charts, which also define the prevailing ocean currents. These charts and the various remarks on "Passages" throughout the book (giving the author's personal experience and that gathered from analysis of many ships' logs) should tend to shorten steamer voyages considerably, or at any rate to give navigators greater confidence in adopting any particular route. We hope to see one or more coaling stations established in the central portion of the Indian Ocean, and then the breaking down of a steamer will be a less disastrous affair than hitherto.

Four other charts exhibit the probably best tracks for sailing vessels throughout the Indian Ocean during four different periods of the year. These will supply a desideratum to mariners. In the construction of these wind and passage charts the author has had the most opportune aid of the excellent wind and current Atlas, recently published by the Admiralty. The tracks which have been delineated are what may be called "studding-sail tracks," that is to say, allowing generally for the wind being *abeam*, or *abaft the beam*. Consideration of the vexatious delays endured by ships—in crossing certain portions of the Indian Ocean—has led to a new system advocated in this book, which may be explained as follows:—Different belts of wind have to be crossed, according as the sun is north or south of the Equator. For instance, after rounding the Cape of Good Hope, a ship has firstly the Anti-Trade, then the S.E. Trade-Winds, then (from November to April) the N.W. or Middle Monsoon, before she crosses the Equator to get into the N.E.

Monsoon. It is obvious then that if she fall to *leeward* in one belt of wind, she will be all the more to *windward* as she enters the adjoining belt. Again:—at the opposite season of the year, the S.E. Trade blows nearly up to the Equator, and ample *Westing* must be made, whilst in the Trade-wind region, to enable her to fetch the desired goal.

It will be observed that no attempt is made to retain on the passage charts those names by which the tracks adopted by former navigators were known to the world. They were not the result of experience, but merely tentative tracks; nor were our ancestors acquainted with the (now well-defined) belts of wind which are exhibited on these Wind and Passage Charts.

He assumes a great responsibility who would perform the functions of "Indian Ocean Pilot," and nobody should undertake such a task without considerable personal experience of Eastern seas. An uninterrupted service (during which he was accumulating "Notes"), of 19 years in those seas, entitles the author of this "India Directory" to a hearing from his brother mariners, and in the patience of hope he looks forward to receiving many fresh hints from them—as the ramifications of our ocean highways become better known—which may enable him to improve future editions of his book. Warnings (based on the experience of former navigators), of those localities where exceptionally bad weather may be found, should have the beneficial effect of shortening passages and rendering Oceanic navigation less perilous than heretofore. A so-called *scientific* nomenclature has stepped in and altered thousands of well-known names upon Admiralty Charts, to the utter bewilderment of the poor seaman. Many years must elapse before existing "Directories" can be so altered as to correspond with the latest charts. Fortunately, the author has been able to give in the "Index" (in brackets) these new-fangled names.

With gratitude the Author puts on record the names of those who have helped him in his labours. Firstly he would mention the late Mr. Richard Green, who (twelve years ago) kindly permitted access to all the valuable logs of his Blackwall Liners, the *personnel* and *matériel* of which are well known to have been second to none of their kind. To the officers of the Hydrographic Department of the Admiralty, especially to Captains Davis and Hoskyn (the latter recently deceased) and to Staff-Commander Hull, the present Superintendent of Charts, he is indebted for ready help at all times in affording him access to the latest issues of Admiralty Charts and Sailing Directions. The general public is little aware of the patient, peaceful labours of these intelligent gentlemen who belong to the navigating class of the Royal Navy. The author's earnest hope is that still further advantage may ere long be taken of the world-wide experience of officers of their stamp, by employing double the present number in the Hydrographic Department of the British Navy.

At the India Office there is no Marine Department; but the author is much indebted to Mr. Clements Markham, C.B., and to Mr. Trelawny Saunders, the Geographer, for access to all existing documents saved from the hands of the destroyer, when the poor old Indian Navy fell a victim to imaginary political and financial necessities.

He is also much indebted to Lieut. C. R. Low, late of the Indian Navy, for completing and bringing through the press the "Index" to this "India Directory"; and to Mr. W. Parkes, the eminent harbour-engineer, for observations on Tides.

A. DUNDAS TAYLOR,

Commander, late Indian Navy.

February, 1874.

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CATALOGUE OF ADMIRALTY CHARTS.

REFERRED TO IN THIS BOOK.

ENGLISH CHANNEL, AND SOUTH COAST.

<i>No.</i>	<i>Scale.</i>		<i>s.</i>	<i>d.</i>
1	<i>m</i> = 0·02	British Islands to Mediterranean Sea	2	6
1598	<i>m</i> = 0·1	English Channel—1844; corrections to 1872	3	0
2675	<i>m</i> = 0·15	English Channel 3 Sheets, 1859; each	2	6
2045	<i>m</i> = 1·4	SHEET 5—Owers to Christchurch, including Spithead, and the Circum- navigation of the Isle of Wight, with Views	4	0
2669	<i>a, b m</i> = 0·5	Channel Islands, 2 Sheets; various to 1872.	5	0

FRANCE, SPAIN, AND PORTUGAL—WEST COASTS.

2694	<i>m</i> = 1·5	D'Ouessant Ile (Ushant) and Channels between the main land, with Views	3	0
1755	$\left\{ \begin{array}{l} m = 0·5 \\ m = 1·0 \end{array} \right\}$	Ferrol Harbour to Cape Finisterre, with a Plan of Corcubion Bay	1	6
87	<i>d</i> = 6·0	Finisterre Cape to St. Mary Cape, Leichoes, Oporto, Figueira, St. Martin, Aveiro, Peniche, Burlings, Setubal, Villa Nova de Portimao, and Lagos, 1813; with additions to 1872	3	0
92	<i>m</i> = 0·2	Cape St. Vincent to Gibraltar Strait—corrections to 1872	2	6

MEDITERRANEAN SEA.

2158	<i>d</i> = 1·1	Mediterranean Sea, Plans of Gibraltar, Valetta, and Corfu	3	0
2718	<i>a, b, c, d</i> = 2·0	Mediterranean Sea, 3 Sheets; each	2	6
165	<i>d</i> = 6·3	Sardinia Island to Malta, including Sicily	2	6
194	<i>m</i> = 1·15	Malta and Gozo Islands, with Views—1863: corrections to 1872	2	6

ATLANTIC OCEANS.

		Pilot Charts for Atlantic Oceans, 1871	17	6
2059	<i>d</i> = 0·3	North Atlantic Ocean, General; corrections to 1872	2	6
2203	<i>d</i> = 0·4	South Atlantic Ocean, General; corrections to 1872	2	6
1950	<i>m</i> = 0·07	Azores or Western Islands; corrections to 1867	1	6
1831	<i>m</i> = 0·4	Madeira Island, with Views; corrections to 1872	2	0
1894	<i>m</i> = 0·08	Canary Islands, General Chart; corrections to 1867	1	6
366	<i>m</i> = 0·15	Cape Verde Islands, General Chart; corrections to 1867	2	0

SOUTH ATLANTIC ISLANDS.

<i>No.</i>	<i>Scale.</i>		<i>s.</i>	<i>d.</i>
1397	<i>m</i> = 3·0	Penedo de San Pedro, or St. Paul's Rocks, with View	0	6
388	<i>m</i> = 2·2	Fernando Noronha Island, with View	0	6
1691	$\left\{ \begin{array}{l} m = 2\cdot0 \\ m = 4\cdot0 \end{array} \right\}$	Ascension Island; corrections to 1868	1	6
1771	<i>m</i> = 2·0	St. Helena Island, 1816; corrections to 1867	1	6
2228	<i>m</i> = 0·6	Tristan da Cunha Group; corrections to 1868	1	6

SOUTH AMERICA—EAST COAST.

528	<i>m</i> = 0·05	SHEET 4—Maranhã to Pernambuco, with Plans of—Maranhão, Parahiba, Aracati or Jaguarybe River, and Rio Grande do Norte, 1857, and 1867; corrections to 1871	2	6
529	<i>m</i> = 0·05	SHEET 5—Pernambuco to Victoria, with Plans of—Pernambuco, Maceio, Bahia, Ilhéos, Espirito Santos, St. Paul's, Cabral and Santa-Cruz Bays, Camamu River, and Views	2	6
550	<i>m</i> = 0·05	SHEET 6—Victoria to Santa Catharina	2	6
2522	<i>m</i> = 0·03	SHEET 7—Santa Catharina to Rio de la Plata, with Views	2	6

AFRICA.

1226	<i>d</i> = 1·5	SHEET 1—Gibraltar Strait to Gambia River, including Madeira, Canary Islands, &c.	2	6
594	<i>d</i> = 1·4	SHEET 2—Gambia River to Lopez Cape and Anno Bom Island, with Views—also entrance of Dembia River; additions to 1871	2	6
595	<i>d</i> = 1·5	SHEET 3—Anno Bom to Hollams Island, in Lat. 24° 36' S., with various Plans of Harbour, and Dangers	2	6
596	<i>d</i> = 1·4	SHEET 4—Hollams Island to Corrientes Cape, including the Cape of Good Hope, with Plans of various Bays	2	6
597	<i>d</i> = 1·3	SHEET 5—Mozambique Channel—Cape Corrientes to Juba Islands, including Madagascar	2	6
598	<i>d</i> = 1·2	SHEET 6—Juba Islands to Muscat in Arabia, with the Red Sea Entrance corrections to 1871	2	6

AFRICA—SOUTH COAST.

2082	<i>m</i> = 0·4	SHEET 1—Table Bay to Agulhas Cape, with Plans of Table and Simons Bay, and View	2	6
2095	<i>m</i> = 0·05	Hondeklip Bay to Natal Port, with the Agulhas Bank, or Cape of Good Hope and adjacent coast	2	6

AFRICA—EAST COAST.

651	<i>m</i> = 0·1	SHEET 4—Primeira Islands to Mozambique, with Antonio River	1	6
1809	<i>m</i> = 0·2	SHEET 5—Mozambique to Pomba Bay, with plan of Fernando Velosa Bay, or from 15° S. to 18° S.	1	6
657	<i>m</i> = 1·0	SHEET 6—Querimba Islands, from Pomba Island to Peguin Point, or from 18° 2' S. to 11° 51' S.	1	6
658	<i>m</i> = 0·4	SHEET 7—Peguín Point to Delgado C., or from 11° 52' S. to 10° 41' S.	1	6
1808	<i>m</i> = 0·2	SHEET 8—Delgado Cape to Quiloa or Kilwa, or from 10° 41' S. to 8° 44' S., with Kiswara Harbour	1	6
662	<i>m</i> = 0·17	SHEET 9—Quiloa Point to Goonja, Monfia, and Latham Islands, or from 8° 52' S. to 6° 37' S.	1	6
664	<i>m</i> = 0·17	SHEET 10—Goonja Islands to Chala Point, or from 6° 38' S. to 4° 23' S., including Zanzibar and Pemba	1	6
665	<i>m</i> = 1·5 Zanzibar—S.W. Coast and Harbour	1	6

CATALOGUE OF ADMIRALTY CHARTS.

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No.	Scale.	s.	d.
1811	m = 0.16 SHEET 11—Chala Point to Kwyhoo Bay	1	6
670	m = 0.25 SHEET 12—Kwyhoo Bay to Juba, or from 2° 5' S. to 0° 10' S., including the Juba or Dundas Islands	2	0
100 (a, b)	m = 0.25 Africa N.E. Coast—Ras Gulwainee to Ras Haffoon; 2 Sheets each	2	0

MADAGASCAR.

677	m = 0.02 East Coast, including Mauritius, Seychelles, and Plans of Sandy, Coetivy and Tromelin Islands	1	6
597	d = 1.3 Mozambique Channel, with Madagascar	2	6
706	m = 0.4 Passandava, Marbacool, and Chimpaykee, with Plan of Mamooka and Nos Beh Islands	1	6

INDIAN OCEAN ISLANDS.

2398	m = 0.18 Kerguelen Island, with Plan of Christmas Harbour	1	6
1921	m = 3.0 St. Paul Island, with Views; corrections to 1872	1	6
715	m = 0.4 Rodrigues Island, or Diego Rais	0	6
1497	{ m = 0.6 } Réunion or Bourbon Island, with several Plans of Anchorages; with m = 3.0 Views	3	0
711	m = 0.5 Mauritius Island—French M.S.; corrections to 1869	1	6
1881	m = 0.6 Cargados Carajos, Shoals; corrections to 1867	1	6
718	m = 0.4 Farquhar, or Joao de Nova Islands	0	6
2762	m = 0.24 Comoro Islands, and 4 Plans	2	6
721	m = 0.13 Seychelles Islands; corrections to 1872	1	0
3	m = 0.2 Chagos Archipelago; corrections to 1871	2	6
4	m = 1.0 Chagos Archipelago, principal Groups of	1	6
5	m = 0.5 Sokotra Island; 1835	2	6
6 a, b	d = 0.10 Aden Gulf, 2 Sheets; corrections to 1871, each	2	0
7	m = 1.0 Aden Cape, the several Bays near, and Views; corrections to 1872	2	6

RED SEA.

8 a, b, c, d, e	m = 0.11 Red Sea, General Chart, 5 Sheets; new issue, each	2	0
2592	m = 4.0 Red Sea, Perim Island: corrections to 1872	1	0
2838	m = 0.5 Red Sea, Jubal Strait, and Plan of Tur Road, with Views; corrections to 1872	2	6
734	m = 1.95 Red Sea, Suez Bay, 1870	2	6

EAST INDIES—ARABIAN COAST TO SUNDA STRAIT.

2483	d = 0.20 Indian Ocean, with Western portion of Pacific Ocean and Curves of Variation	3	0
748 a	d = 0.5 SHEET 1—Indian Ocean, Southern Portion	7	0
748 b	d = 0.5 SHEET 2—Indian Ocean, Northern Portion		

ARABIA AND PERSIA.

10 a, b, c, m	= 0.10 Arabia, S.E. and N.E. Coast of, with Plans of Makatein, Sughra, Sharmah, Ras Kosair, Ba-l-haf, Shahah Roads, Bander Burum, Bander Risut, Merbat, Keshin, & Makalleh Bays, 9 Sheets, each	2	6
2869	m = 8.4 Maskat and Matreh, with Views	1	6
2837 a, b	m = 0.8 Persian Gulf, General Chart, with 10 Plans and Views, 2 Sheets, 1862; each	3	0

BELOOCHISTAN, SINDH AND CUTCH COASTS.

<i>No.</i>	<i>Scale.</i>	<i>s.</i>	<i>d.</i>
38 <i>m</i>	= 0·07 Koee Mubarrack to Karachi, with 4 Plans	2	0
40 <i>m</i>	= 8·0 Karachi (Kurrachee) Harbour	2	6
42 <i>m</i>	= 0·11 Sindh, Kutch and Katiwar Coasts; corrections to 1872	2	6
43 <i>m</i>	= 0·4 Kutch Gulf, 1851—2.	2	6

INDIA—WESTERN COAST.

795 to 751 <i>m</i>	= 0·5 India, West Coast—13 SHEETS, from Surat to Cape Comorin, each	2	6
2736 <i>m</i>	= 0·09 SHEET 1—Kutch Gulf to Viziadroog, with Plans of Diu and Pur Bunder Harbours	2	6
2737 <i>m</i>	= 0·08 SHEET 2—Viziadroog to Cochin, including the Lacadivh Archipelago	2	6
242 <i>m</i>	= 2·0 Sedashigar Bay, River, and Carwar Port, 1855	1	6
2738 <i>m</i>	= 0·08 SHEET 3—Cochin to Comorin Cape, with part of the Maldivh Islands	2	6
2621 <i>m</i>	= 1·5 Bombay Harbour, with a Plan	2	6
66 <i>a, b, c m</i>	= 0·25 Maldivh Islands, 3 Sheets, each	2	6

CEYLON.

813 <i>m</i>	= 0·25 Ceylon Island, from Colombo on the West to the South and S.E. Coast, including the Bassas, with Plans of Colombo, Dodandowe, and Belligam Bays, Kirinde Road, and Point de Galle Harbour	2	6
68 <i>a, b m</i>	= 0·24 Palk Strait and Manaar Gulf, in 2 Sheets, each	2	0

BENGAL BAY.

70 <i>a, b m</i>	= 0·03 Bengal Bay, 2 Sheets, with 15 Plans, each by Lieut. Heathcote, I.N.	2	6
81 <i>m</i>	= 2·0 Coringah or Cocanada Bay, 1857	2	0
1681 <i>m</i>	= 0·1 SHEET 5—Palmyra Point to Chittagong, 1840	3	0
822 <i>m</i>	= 0·1 SHEET 6—Chittagong, Kyouk Phyou, Ramree, and Naaf Rivers	1	6
823 <i>m</i>	= 0·1 SHEET 7—Negrais, Rangoon, Martaban	1	6
834 <i>m</i>	= 0·7 Rangoon and Bassein or Negrais Rivers, 1854	2	0
824 <i>m</i>	= 0·1 SHEET 8—Tavoy and Mergui, 1840	1	6
825 <i>m</i>	= 0·13 Andaman Isles, with View	2	6
840 <i>m</i>	= 0·15 Nicobar Islands with Saoui and South Bays, Pulo Milu, and St. George's Channel	1	6

SUMATRA, WEST COAST AND ADJACENT ISLANDS.

2760 <i>m</i>	= 0·1 SHEET 1—Sumatra Island, West Coast—from Acheen Head to Tyingkokh Bay, with Plans	3	0
2761 <i>m</i>	= 0·1 SHEET 2—Sumatra Island, West Coast—Tyingkokh Bay to Sunda Strait and 7 Plans of Anchorages	3	0
2056 <i>m</i>	= 0·3 Sunda Strait and its approaches, with Plans of Krakatoa Channel—English and Dutch Surveys, 1867	2	6
2510 <i>m</i>	= 2·0 Cocos or Keeling Islands, with Refuge Port.	1	6

INTRODUCTION.

WINDS AND CURRENTS, MAGNETISM, VARIATION OF COMPASS, TIDES.

Particular, or Local Winds, Weather, and Currents, are described in the different parts of this work, to which the reader is referred. Winds may be arranged under three distinct heads: *Constant*, *Periodical*, and *Variable*. Constant winds are those which blow always in the same direction, and are called Trade Winds. Periodical Winds, or those which blow one part of the year in one direction and the other part in a contrary one, are generally called Monsoons. Variable Winds are those which are not subject to any determinate periods or uniformity.

TRADE WINDS seem to be occasioned by the rotatory motion of the earth on its axis, combined with the influence of the sun in rarefying the atmosphere between the tropics. The cold dense air at the poles would naturally move along the surface of the globe to take the place of the hot rarefied air at the Equator; but the earth's rotatory motion, and the gradually increasing velocity of this motion at its surface from the poles to the Equator, oblige these polar currents of air to diverge from their meridians on their route to the Equator. The points of greatest rarefaction are those in the *Thermal Girdle*, or *Heat Belt*, under the sun; and, as the earth revolves, these places pass under the sun from E. to the W.; thus the denser air must move towards them, and occasion a constant Easterly wind in the ocean remote from land between the tropics.

As the earth revolves on its axis, each point on its surface has a rotatory E. velocity proportional to the radius of its circle of latitude. A wind from N. in the N. tropic, becomes a N.E. wind, and a S. wind, in the S. tropic, becomes a S.E. wind. The earth is also continually acting on the air by *friction*, and communicating to it a rotatory velocity, which counteracts the Westerly tendency, or (in other words) deprives the wind of its Easting as it nears the Equator; but as the wind (say the S.E. Trade) passes the Line towards the N. Solstice, or Heat Belt,—that is to say, goes from a place of greatest velocity to one of a less—it becomes a S. by W. wind, owing to this friction.

By the dense air proceeding from both polar regions in a N. and S. direction towards Cancer and Capricorn, and afterwards more Westerly towards the points of greatest rarefaction, a N.E. wind is produced on the N. side, and a S.E. wind on the S. side of the Equator. These are called trade winds, and in their direction incline towards the Thermal Girdle. When the sun is near the Tropic of Cancer, or returning from it (after *tarrying* there, almost vertical for two months), having greatly heated the N. hemisphere, the S.E. trade wind blows with strength, and its N. limit reaches to, and in some places nearly 10° beyond, the Equator. The N.E. trade wind, at the same time, blows with less strength, becoming contracted in its limits; the S. limit then receding several degrees to the N. of the Equator; and between the two, we find in the open ocean a broad belt of light airs and calms. And again, in the opposite season, when the S. hemisphere is greatly heated by the sun, the N.E. trade wind blows stronger, and approaches nearer to the Equator; the strength of the S.E. trade wind, at the same time, being diminished considerably by the sun's influence. When these N. and S. currents of air meet about the Equator, they destroy each other, producing a calm, and become deflected upwards, forming an ascending current.

As there is a perpetual current of air proceeding from the polar regions to the Equator, where it is rarefied, while the superior gravity of the cold makes the heated air ascend to the upper regions of the atmosphere, whence it returns to the poles, to preserve the equilibrium, the upper current

of air must proceed from the parts in which the heat is greatest, so that by a kind of atmospherical circulation, admirably adapted to the preservation of animal life, the N.E. trade wind below will be attended by a S.W. wind above, and the S.E. trade wind below with a N.W. wind above. This opinion is corroborated by the clouds in the upper part of the atmosphere being frequently seen to move in a direction contrary to the trade winds, and by an instantaneous change of wind often experienced when the limits of the trade winds are passed.

Trade winds are only constant in the ocean at a considerable distance from land; for large islands and continents obstruct the regular currents of the atmosphere, and thereby produce either periodical or variable winds. When land is heated by the sun's influence, the atmosphere over it becomes rarefied, the air acquires motion, and a wind is produced, blowing from the ocean towards the land. This may be exemplified by the winds on the African coasts, within the limits of the N.E. trade, blowing often from North and N.W. about Cape de Verde; and from S.W. and S.S.W. betwixt the Coast of Guinea and the Cape of Good Hope, within the limits of the S.E. trade, instead of N.E. and S.E., as is experienced when well out from the land, in the open ocean.

When the land of Australia is heated by the presence of the sun in the S. hemisphere, the wind blows generally from the N.W. upon the N.W. coast; from the S.W. upon the W. coast; from the S.W. the S., and S.E., upon the S. coast: and from S.E. and E. upon the E. coast of that extensive tract of land. Winds, indeed, blow nearly always from the sea by day, towards the heated atmosphere over the land; but contiguous to shores, land breezes are often experienced, coming off dry and parching.

High land obstructs the regular progress of winds. A steady trade wind will pass over a considerable tract of low level land without being much changed in its direction or velocity; particularly if that land be barren and destitute of moisture. But if the wind come in contact with high land or mountains, it is compressed in passing over their summits; as the atmosphere, being heated by the sun's rays according to its density, is much warmer at the bottom than at the top of mountains; consequently the air is cooled in its ascent, and being frequently condensed into humid clouds or fog, is discharged in wet misty vapour, or in small rain, upon the tops of mountains. This may be often seen on Table Mountain at the Cape of Good Hope, or on high islands between the tropics, when the sun shines bright below, with clear weather around.

The presence of the sun in either hemisphere obstructs considerably the regularity and strength of the trade wind in that hemisphere, and *vice versa*.

The Trade Winds extend generally to about 28° on each side of the Equator, and there is usually a considerable space between them, in which light variable winds prevail mostly from the W., a *counter-current* of air, forming in several parts of the globe, near the Equator, a kind of monsoon, and carrying in some parts a current of water with it.

The N.E. and S.E. trade winds prevail in the open sea in the Atlantic and Pacific Oceans; and from the great extent of the latter, they generally blow more steadily in it than in the former; and the S.E. trade wind in the S. Atlantic Ocean blows more steadily than the N.E. trade wind to the N. of the Equator, where the ocean becomes contracted between Cape de Verde and the N. extremity of the coast of Brazil; but towards the West India Islands, the N.E. trade wind generally blows steadily between E. and E.N.E.

The S.E. trade wind prevails also in the Indian Ocean, from within a few degrees of the E. side of Madagascar nearly to the coast of Australia, between the parallels of 10° and 26° S.

MONSOONS, or PERIODICAL WINDS, are those which blow half of the year from one quarter, and the other half-year from the opposite direction. They blow more steadily in the East-Indian Seas than in any other place, particularly to the N. of the Equator, from the coast of Africa to the E. side of the Bay of Bengal; also in the China Sea, but with somewhat less regularity in the N. part of it.

The Thermal Girdle under the sun, where the atmosphere becomes rarefied, and the heated air ascends, is nature's suction-pump, and the principal cause of these winds, as well as of the trade winds. The situation of the land, as connected with the course of the sun, has not so much influence as formerly imagined. Surely Africa is heated enough between April and Sept.; yet the S.E. Trade, having blown towards it in the direction of Zanzibar, then turns (*short* of it) towards the N.E., and becomes the S.W. monsoon of the Arabian Sea: the extensive coasts of India being greatly heated when the sun is vertical to them, a S.W. wind blows from the ocean towards the land to restore the equilibrium. The current of air proceeding from the ocean, being highly charged with moisture, is gradually condensed into rain, which descends in great quantities upon the coasts of India where high land fronts the ocean to the S.W., or W.S.W.

When the sun returns into the S. hemisphere, the atmosphere there becomes greatly rarefied around the Thermal Girdle, or that belt immediately under the sun, and a N.E. wind or monsoon

is then produced in N. latitude, blowing towards the heated parts about the Equator. This is the dry season on the coasts of India, for the wind blowing from the land brings fair weather; and the rainy season is produced by wind blowing from the ocean towards the land, which is generally the case on both sides of the tropics.

The S.W. Monsoon prevails from April to Oct., between the Equator and the Tropic of Cancer, and it reaches from the East coast of Africa to the coasts of India, China, and the Philippine Islands; its influence extends sometimes into the Pacific Ocean as far as the Marian Islands, or to about lon. 145° E., and it reaches as far N. as the Japan Islands. In the same season, a S.S.W. monsoon prevails to the S. of the Equator in the Mozambique Channel, changing a few points in direction, owing to the conformation of lands on each side of that channel.

The S.W. Monsoon, of the Arabian Sea and Bay of Bengal, is merely a prolongation of the S.E. Trade, blowing towards the earth's Thermal Girdle; and we must remember that that girdle lies to the N. of the latitude of Bombay, from mid-May to the end of July. For more than three-score and ten days, the suction-pump has there been at full work. But why should the wind, thus drawn in along the surface of the sea, prefer to fall upon India as a S.W. and a W. wind, rather than upon Arabia and Africa as a S.E. wind? We accept Dove's explanation, that the S.E. Trade is (in crossing the Equator) a volume of air moving from a lower to a higher latitude: thus carrying with it into those higher latitudes, the equatorial velocity, and appearing consequently as a South wind with Westing in it. Sir John Herschel also says that the earth acts upon the air by *friction*, communicating to it a rotatory velocity. Thus, the S.E. Trade wind, as it approaches the Equator, loses its *Easting*; and, as it passes to the N. of the Equator, acquires *Westing*, becoming a S.W. monsoon.

We may understand this better if we reflect that at the parallel of Mauritius (being as much to the S. of the Equator as Maseira Island on the Arabian Coast is to the N.), the rotatory velocity of the earth is considerably less than at the Equator. Passing then from that Capricorn region of a less rotatory velocity to the Equator, where the greatest velocity is found, the wind acquires *Easting*; but passing on beyond the Equator towards the Cancer region (one of less velocity), it acquires *Westing*, and develops itself as the S.W. Monsoon.

The N.E. monsoon prevails from Oct. to March throughout nearly the same space as that mentioned above; but the monsoons are subject to great obstructions from the land; and in contracted places, such as Malacca Strait, they are changed into variable winds. Their limits are not everywhere the same, nor do they always shift *exactly* at the same period. The N.E. monsoon of India and the China Sea is no other than the undisturbed N.E. Trade-wind. The N.W. winds below the Equator are simply an extension of the N.E. Trade, blowing towards the Heat-Belt; whilst the sun is near the Tropic of Capricorn, and daily passing over the Australian deserts.

The N.W. monsoon prevails between the N.E. part of Madagascar and the W. coast of Australia from Oct. to April, and it is generally confined between the Equator and 10° or 11° of S. latitude, but subject to irregularities. This monsoon seldom blows steadily in the open sea, although in Dec. and Jan. it generally prevails, and in these months sometimes extends from lat. 10° or 12° S. across the Equator to lat. 2° or 3° N. This is the rainy monsoon to the S.-ward of the Equator, and the S.E. monsoon is the dry season.

The S.E. monsoon predominates from April to Oct. in the Java Sea and whole Asiatic Mediterranean, as far as and beyond Papua, (New Guinea), and in some places reaches the Equator, when the sun is near the northern tropic; but this monsoon may be considered as an extension of the Pacific S.E. trade following the sun; and when that luminary returns to the S. tropic, this monsoon recedes to lat 10° or 12° S., *backing down* like the S.E. Trade near the Chagos Group.

The parts where the N.W. and S.E. monsoons prevail with greatest strength and regularity are in the Java Sea, and from thence E.-ward to Timor, amongst the Molucca and Banda Islands, and onward to New Guinea. The Westerly monsoon blows as steadily, strongly, and regularly along the N. side of New Guinea, at New Britain, New Ireland, and all contiguous islands S. of the Equator, as far E. as Malanta and the N. part of the New Hebrides, as in any part of the Indian Ocean whatever, and extending in a wind of gradually decreasing constancy and continuation, from hence, far E. to the Society and Marquesas Islands. The limits in latitude appear similar to the Indian Ocean, from 1° N. to 15° S., and occasionally to 19° S., and the period from the beginning of Jan. to the end of March.

Westerly winds are sometimes experienced near the Equator, in the Pacific Ocean, a great way to the E. of New Guinea; and also in the Atlantic Ocean, westerly winds at times occur near, or a little to the N., of the Equator, forming a counter current to the regular N.E. and S.E. trade winds which prevail on each side of it.

INTER-TROPICAL HEAT-BELTS of the Indian Ocean. Some brief explanation of the sun's passage over the broad zone between the Tropics seems highly necessary in order that the seaman may understand what we mean by the expression—Thermal Girdle, or Heat-Belt—applied in the foregoing remarks concerning the Monsoons. Thermal Maps have been from time to time produced by Berghaus, Dove, and their copyists. In all these examples the Equator is recognised as the seat of the normal *isotherm* of greatest heat; that line or band being diverted northward or southward, according as observation has proved the idea to be inconsistent with ascertained facts. Thus, there has appeared (in many a physical atlas) an imaginary waving line round the globe, which has been styled the "*Warmth-Equator*," and corresponding lines of equal annual temperature, called "*Isotherms*," girdle the higher latitudes. Of course such a plan would be a necessity on any single map which should attempt to show at one glance the *mean* direction of winds and currents and the *means* of heat throughout the air and the sea. But to the seaman it is worse than useless—it is positively misleading. However, we do not object to "*Isotheres*," or lines of equal *summer* temperature; nor to "*Isochimenes*," or lines of equal *winter* temperature.

The notions on tropical climate which *were* current twenty years ago—and *even now* are entertained by many physical geographers—were well reviewed in a little treatise on "The Asiatic Mediterranean," by Trelawny Saunders, now Geographer at the India Office, as follows:—

"It is admitted that the sun is the paramount source of atmospheric heat. But his influence on the earth is referred to his *apparent* path in the ecliptic; and the *real* motion of the earth in her path around the sun has been lost sight of, in the consideration of thermal and climatological questions. Now it is clear that whatever influence the sun exerts on the earth must be attributed to the *actual* and not to the *apparent* motions.

"But the motion of the earth around the sun, as described by astronomers, and in the accepted theory of the seasons, is inconsistent with the facts which geography demonstrates. The astronomers and climatologists say that the earth moves round the sun in an elliptical orbit, and on a single plane, which is regarded as passing through the centre of the sun and the centre of the earth; the axis of the earth round which she revolves daily, being at an angle of nearly $66^{\circ} 32'$ to the plane of her orbit. This doctrine is inconsistent with the *fact* that the sun is vertical day by day to successive points between the tropics, producing spiral lines on the earth's surface nearly parallel to the Equator. In fact, the sun's solstitial motion is in the parallel of $23^{\circ} 28'$ nearly, N. and S. of the Equator alternately, at intervals of six months; and his equinoctial motion is on the line of the Equator nearly, instead of in lines parallel to the ecliptic.

"**Five distinct Zones in the Tropics.** It is maintained, therefore, that the earth moves around the sun in a spiral path between two planes, which are respectively coincident with the vertical action of the sun on the two tropics, at his nearest approach to either pole, severally and separately, at intervals of about six months. The interval between the spiral lines of the sun's vertical action, on each daily revolution of the earth, is about $15'$ of latitude, subject to variation.

"**Two bands of greatest heat** therefore exist (though they do not co-exist) on the earth's surface, arising from the continuous vertical action of the sun at each tropic; each parched up with heat for a period of 62 successive days, during which time he is passing from lat. 20° to the tropic in $23^{\circ} 28'$, and then back to 20° again. He is vertical for less than one-sixth of that time, over a similar extent of latitude in any other part of his apparent course. The result is a band of deserts under each tropic around the earth. The tropic of Cancer traverses the 'tierras calientes,' or desert regions of Mexico; the Sahara of N. Africa, and the Arabian desert; while the desert of Mekran on the Coast of Beloochistan, and that of Thurr, to the E. of the Indus, are close to it on the north. The tropic of Capricorn traverses the desert of Atacama on the Pacific, in Bolivia; the desert of El Gran Chaco in La Plata; the desert of Kalihari, between the lake Nyassi and the Orange River in South Africa; and the great desert region of Australia, so well described by Sturt. The tropical region appears, therefore, to be burnt up and desert, with trifling exceptions, arising from local causes, which preponderate over the sun's continuous vertical action.

"**The Equatorial region**, or the zone within 10° of the Equator, also presents special characteristics of an excessive kind. The temperature is high, and scarcely varies; the rain falls in torrents during several months; vegetation is rank and luxurious; and animal life revels in its most impressive and abundant varieties. The closer juxtaposition of the sun to this culminating portion of the sphere, may partly account for its preponderating influence there.

"**The zones halfway between Equator and Tropics**, (or between 10° and 20° on both sides of the Equator) are equally remarkable, and peculiarly interesting on account of their remarkable fitness for the occupation of man. All around the earth within those latitudes the country abounds with lakes, rivers, and fertility, but the vegetation is not excessive. The climate also partakes of the qualities prevailing in the temperate zones."

FURTHER REMARKS about Monsoon Winds will be found at pages indicated below.

For Winds and Weather off Cape of Good Hope, *see* page 76. For Algoa Bay, page 83.

For Winds and Currents in Mozambique Channel, *see* page 560.

For Winds and Weather at Mauritius and Rodrigue, *see* page 525. Between Zanzibar and Aden, *see* page 116.

For Winds at the S. extreme of the Maldivas, *see* page 571. At Ceylon, page 306.

For Navigation and Winds of the Arabian Coast, *see* page 233. For Persian Gulf, page 279.

For Winds and Weather on the Malabar Coast, *see* pages 299 to 307.

For Monsoons and Gales in the Gulf of Bengal, *see* pages 317 to 321.

For Monsoons on the West Coast of Sumatra, *see* page 624.

THE SURFACE CURRENTS of the OCEAN flow in harmony with the Trade winds, and the Anti-trades. They are properly distinguished by the different and significant names, *Drift* and *Stream*. The *Drift* is merely the wind's effect on the surface of the ocean. The *Stream* is an accumulation of the parts of the Drift into a collective mass, by the intervention of some obstacle; and onwards it goes because pressed on by fresh drift in its rear. Deep submarine currents may be the effort of nature restoring the equilibrium which surface currents have disturbed; and in this process the rotation of the earth is an active agent.

In the Pacific Ocean, a fair field, and where they suffer no divergence through interposition of a continent, the Trade-drifts flow towards the West, inclining towards the Equator. But, unable to escape through channels of the Asiatic Archipelago into the Indian Ocean (except in a very partial manner at one season of the year), and aided by the peculiar positions of great islands, the two Westerly streams coalesce and produce an Equatorial* Counter-current flowing towards the East. Besides this method of preserving equilibrium, nature has established the Japan current in the North, which is identical in character and origin to the Gulf Stream. Some have ventured to dispute the correctness of Sir John Herschel's conclusions as to the relation of the trade winds to the Gulf Stream. We venture to think that time will vindicate the sound arguments of that eminent man; we only find him wrong when misled by wrong data, and sailors are to be blamed for supplying men of science with that. He says in one place, "the North Pacific currents are as yet far from well understood." We wish to endorse the following remarks from his "*Physical Geography*,"—"From meteorology we learn to refer the great system of aquatic circulation (which transfers the waters of every one region of the ocean, in the course of time, to every other), to the action of our Trade winds, and their compensating currents, the Anti-trades; themselves the results of solar action in combination with the earth's rotation on its axis."

VARIABLE WINDS prevail in both hemispheres from lat. 28° or 30° to the poles, but those from W. and W.S.W. generally predominate in N. latitudes; and those from W. and W.N.W. predominate in S. latitudes.

The prevalence of Westerly winds in high latitudes has been thus accounted for. The upper parts of the atmosphere having a motion towards the poles, contrary to the trade winds, and becoming condensed beyond their limits, descend to the surface of the earth or sea; thus producing the motion from the W. towards the E., to restore the equilibrium which has been destroyed by the trade winds. Immediately beyond the limits of the trade winds, the Westerly winds are generally found to prevail.

These Westerly winds, in high latitudes, are liable to obstructions and changes, from various causes, the influence of the sun being mutable and uncertain in the Temperate Zones; but beyond the Arctic and Antarctic Circles, where a settled frost and cold atmosphere constantly prevail, strong gales and sudden shifts of wind are not so liable to happen as at a greater distance from the poles.

The sun's presence in either hemisphere has great influence upon the prevailing Westerly winds in high latitudes; in the N. Atlantic Ocean the wind generally inclines to W.S.W. in the summer months; and in winter, almost constantly to W.N.W., between the coasts of Newfoundland and Ireland. In the British Channel, Easterly winds often prevail in Feb., March, April, and part of May; during the other months, Westerly winds prevail greatly.

On the N.W. coast of America, S.W. winds prevail in the summer months, and Northerly winds during winter.

* It is to be desired that Physical Geographers would alter the nomenclature of Ocean Currents. The proper Equatorial Current of the Pacific is a counter-current to the E., between the Trade Drifts forced along by the N.E. and S.E. winds. These Trade-Drifts are now called respectively the N. Equatorial and S. Equatorial currents; which names were given before the proper Equatorial E. current was known. (See also Currents in Chapter XX.)

In the S. hemisphere, during the summer months, when the sun is near the Tropic of Capricorn, the winds are sometimes very variable, but prevail at W. and W.N.W. In the winter months they blow mostly from W.S.W. and W., and sometimes from S. or S.E. Westerly winds prevail off the Cape of Good Hope, Cape Horn, and Cape Van Diemen; particularly when the sun is near the Tropic of Cancer: but on the W. coasts which form these promontories, the wind frequently prevails from the Southward, when it is blowing strong from the Westward off their extremities. And S.E. or Southerly winds are *generally* found to prevail more than any other, in Feb., March, and part of April, in the vicinity of those head-lands.

LAND and SEA BREEZES may be considered as a kind of alternating winds, which are generally experienced in settled weather upon coasts or islands between the tropics. They arise from the circumstance of land being a better conductor of heat than water, and consequently being susceptible of a higher degree of temperature by the action of the sun than the sea: this increase of temperature during the day rarefies the incumbent atmosphere, and a current of colder air rushes in from the sea to supply the deficiency, and forms what is called a *sea-breeze*. The progress of this breeze is *regressive* upon the sea, as it commences close to the shore where the motion of the air first inclines to the land, and then gradually extends out to sea; so that vessels close in with the shore get the regular breeze sooner than those which are in the offing. After sunset the atmosphere over the land becomes cool by evaporation; and at whatever time of the night it exceeds in density that over the sea, the air takes a motion from the land towards the more rarefied parts over the sea, producing what is called the *land-breeze*. This is a *progressive* breeze upon the sea, as it begins on the shore, and gradually extends to seaward; and its approach may be sometimes known by an increased noise of the surf.

These land and sea-breezes extend in some places only to a small distance from the shore; but on the Malabar Coast, in the fair season, where they prevail *probably* with greater regularity than in any other part of the globe, their influence is perceptible at the distance of 20 leagues from the land. When the land is greatly heated, and the evaporation not sufficient to cool the atmosphere over it below that of the adjoining sea, there will be no land-breeze, and in such case the wind blows mostly from seaward: this may be observed in the temperate as well as in the torrid zone.

During summer in England, when the weather is settled and serene, a gentle breeze from the sea frequently rises, and increases with the altitude of the sun; it is strongest after noon, when the air over the land is greatly rarefied, and it declines with the setting sun. The evaporation from the land during the night being in this country not sufficient to cool the atmosphere over it below that of the adjoining sea, a land-breeze is consequently seldom experienced in the night. The temperature of the atmosphere being nearly the same over the land and sea, calms generally prevail in the night, until the sea-breeze returns, when the atmosphere over the land becomes heated by the sun in its diurnal course.

SQUALLS are generally of *three* kinds; that called the **Arched Squall** is frequently experienced, and is usually distinguished by the arched form of the clouds near the horizon; but sometimes it assumes the appearance of a dense black cloud, particularly when highly charged with rain or electric matter. From the time that the arch or cloud is first seen above the horizon, its motion is sometimes very quick to the zenith, the interval being scarcely sufficient to allow a ship to reduce the necessary sail before the wind reaches her, which happens when the cloud has approached to the zenith. At other times, the motion of the cloud is very slow, and not unfrequently it disappears, or is dispersed, the impulse of the wind being then not sufficient to reach a ship. As a general rule, it may be observed, that if there be rain in these squalls preceding the wind, the latter will probably follow the rain in sudden severe gusts; whereas, if the wind precedes the rain, the squalls are seldom so furious, and terminate in moderate showers of rain. This general rule, however, is often interrupted by the operation of local causes. The **Descending Squall** is not so easily discerned as the former, because it issues from clouds which are formed in the lower parts of the atmosphere near the observer; and when clouds are thus formed, they generally produce showers of rain and successive squalls of wind. The **White Squall** is not often experienced; but it sometimes happens near or within the tropics, particularly in the vicinity of mountainous land. This squall generally blows very violently for a short time, and as it is liable to happen when the weather is clear, without any appearance in the atmosphere to indicate its approach, it is consequently very dangerous. The only mark that accompanies it is the white broken water on the sea surface, which is torn up by the force of the wind. Squalls, and also storms, are sometimes *progressive*, at other times *regressive*, when obstructed by an opposite wind, or according as the point of greatest rarefaction is situated, as may be seen in the description of the sea-breeze. When a squall comes up against an opposite wind, its motion is greatly retarded thereby, and a ship sometimes in this case outruns the squall, and overtakes other ships which are within the limits of the opposite

wind. Progressive winds, when they have an opposite wind to subdue, are frequently preceded many hours by a swell, which extends a great way before them.

In Straits or Channels formed between high lands, strong winds generally blow directly through them: this is experienced in many parts of the Eastern seas, such as the Straits of Shadwan in the Red Sea, the Mozambique Channel, Straits of Macassar and Lombock; also in the entrance of the river St. Lawrence in North America, and frequently in the Frith of Forth in Scotland, although the latter is not bounded by *very* high land.

In many places between the tropics, where shoal coral banks shoot up out of deep water, a decrease of the prevailing wind is frequently experienced upon them; for when a steady wind is blowing over the surface of the deep water, no sooner does a ship get upon the verge of a shoal coral bank, than a sudden decrease of wind is often perceived. This is probably occasioned by the atmosphere over these banks being less rarefied, and cooler by the increased evaporation, than that over the deep water; consequently not requiring so great a supply of air to restore the equilibrium, as the circumjacent parts which are more rarefied and heated. Water, in small quantities, parts quickly with its heat, but retains it when in large quantities; in other words, the quantity of water evaporated and the cold generated in a given time is always in proportion to the extent of surface and the depth of the evaporating mass: the evaporation, therefore, over shoal banks is always greater than over deep parts of the sea, and the atmosphere, as well as the surface of the water, proportionally cooler over the former than over the latter.

The changes of the Moon are more likely to be accompanied by stormy weather than the full moon. The Nautical Almanack gives all the lunar points. When her semi-diameter and horizontal parallax are *greatest*, she is in that part of her orbit nearest the earth, called *Perigee*. When the semi-diameter and horizontal parallax are *least*, she is farthest from the earth, or in *Apogee*. The Perigee of the Moon is likely to be accompanied by the greatest changes which happen from a *single* lunar point. The new moon, next to Perigee, is likely to be attended by great changes of weather. At new moon coinciding with Perigee, the greatest changes may be expected; and at the equinox, the chances of a change must be great.

STORMS may be classed under three heads: **Gales of Wind, Hurricanes, and Whirlwinds.**

GALES generally happen beyond the tropics, outside of the limits of Trade winds; for in high latitudes, gales of wind, or storms, blow sometimes from one direction several days together, particularly during winter. These strong gales prevail mostly from the Westward, and they are not so liable to shift round suddenly as the storms near the tropics; this, however, sometimes happens, and has occasioned the loss of many ships in the Atlantic Ocean, having their square sails set, and consequently not prepared for a sudden change.

The gales of wind which happen near and within the tropics are generally of short duration, and liable to veer round suddenly to an opposite direction.

HURRICANES or CYCLONES are seldom experienced beyond the tropics, nor nearer to the Equator than lat. 9° or 10° N. or S.: they rage with greatest fury near the tropics in the vicinity of the main-land or islands: far out in the open ocean, they rarely occur; and when they happen within 10° of the Equator, they generally are less violent than nearer to the tropics.

These are dreadful tempests, in which (when the centre passes over the ship) the wind shifts sometimes suddenly from one direction to the opposite, raising the sea in pyramids; its violence is frequently so great as to overcome all resistance, carrying away the masts of ships, and tearing up trees by the roots. The velocity of the wind in some violent hurricanes has been estimated at about 80 or 90 m. an hour: in a pleasant brisk gale it is about 20 m. an hour. In some places, hurricanes are occasionally accompanied by an earthquake.

Cyclones* happen near the E. coast of Madagascar, near the Islands of Mauritius and Reunion, and to the E. of these islands, within the limits of the S.E. Trade: they are also liable to happen near the coasts of India, particularly in the Bay of Bengal at the changing of the monsoons.

They are called Ty-foongs by the Chinese, and frequently happen on and near the coast of China, extending from thence to the E.-ward of Luconia, and to the N.E.-ward as far as the Japan Islands. A description of them will be found in Volume Second of this Work, under the title "China Sea;" and the hurricanes which happen near the islands of Mauritius and Bourbon are described at page 525; and also in Chapter XX. on Passages.

Admiral Sir Francis Beaufort, R.N., for many years Hydrographer of the Admiralty, drew up for the edification of seamen the following remarks on Revolving Storms:—

The nature of Hurricanes, with propriety called **Revolving Storms (Cyclones)**, has of late

* Fiddington's Sailor's Horn-Book of Storms should be in the library of every Master Mariner. Colonel Copper, H.E.I.C.S., was about the first to notice the revolving tendency of these storms.

years much engaged the attention of meteorologists and philosophers ; but it is a subject of more immediate importance and of far deeper interest to practical seamen, who would therefore find their time amply repaid by a careful perusal of the several works of Redfield, Piddington, Thom, Meldrum, and Sir William Reid. With a zeal worthy of all praise, these gentlemen have collected the facts and endeavoured to develop the laws by which such storms are governed, and have thereby entitled themselves to the lasting thanks of the whole maritime community for having, not only demonstrated the dangerous consequences of neglecting the indications by which those storms are invariably preceded, but for having pointed out the means by which they may generally be avoided.

The joint labours of these authors have indeed so forced the subject on the attention of the public, that to suppose any commanders altogether ignorant of it would now be a severe reproach. Yet there are many who, from want of opportunities to study those works, are so imperfectly acquainted with the peculiar phenomena which distinguish these storms, that they are unable to act in the hour of need with decision and firmness. For their use, therefore, the following pages have been drawn up ; the object being to show the seaman the necessity of seeking more diligently for full information on these important matters, and, in the meantime, to furnish him with a few brief and general rules by which he can determine whether it be only a common gale that is approaching, or whether it is likely to be one of these revolving storms ; and, if the latter, to show him how it may be eluded, or, if too late for that, how to prevent his being drawn into its vortex.

Gyration. The space over which these storms have been known to expand themselves varies from twenty or thirty to some hundreds of miles ; blowing continually round and round a centre or vortex, but with an ever varying force, now lulling into little more than a strong breeze, and then again suddenly swelling up into a blast of uncontrollable fury. But the peculiar characteristic of their revolving action is, that in each hemisphere of the world the gyration invariably takes place in one direction, and that direction *contrary* to the apparent course of the sun ; so that in north latitudes these storms revolve from right to left, and in south latitudes from left to right. The knowledge of this law is the more especially important, as it not only supplies the seaman with direct means of distinguishing them from common gales, but it reveals to him the actual position of the centre or vortex with respect to the place of his vessel, and therefore points out with unerring certainty the way to escape from them.

Progress. But besides the above circular motion of the wind round a centre, these storms have a bodily progressive movement—rolling onwards, if it may be so expressed, along their desolating tracks, sometimes with great velocity, and sometimes appearing to pause or scarcely to advance more than a few miles in the hour, although the impetuosity of the wind itself round the circle may continue undiminished.

Regions. These storms occur commonly in the three great oceans, the Atlantic, Indian, and Pacific, but they are seldom found within less than 5° or 6° of the Equator, and have not yet been traced into very high latitudes. They appear to be most frequent and most severe in the West India, Madagascar, and China Seas ; and the season in which they are most prevalent is during the sun's return from the summer solstice ; or, in other words, from July to Oct. in the northern hemisphere, and in southern regions from Jan. to April.

Path. Though these storms in traversing the ocean do not always adopt exactly the same path, nor ever travel with any uniform velocity, yet there is so much apparent similarity in their movements as to show that they are ruled by one general law. To endeavour to trace this law, the log books of a great number of vessels in all parts of the sea have been examined, as well as the meteorologic registers of numerous places on shore ; and from them the movements of these storms have been reduced into comparative tables, their separate tracks graphically represented on charts, and their several characteristics analysed with great labour and zeal by the before-mentioned authors. The general result may be thus briefly stated :—In all cases, within the tropics, they commence to the E. ; for some days they travel along a path not exactly W., but inclining a point or two towards the pole of that hemisphere which they are crossing : their rate of movement, though very variable, may be averaged at from 10 to 30 m. in the hour ; and as they advance they seem to be the more inclined to curve away from the Equator. When they reach the 25th degree of latitude they generally curve still more until they move to the N.E. in the N. hemisphere, and to the S.E. in the S. hemisphere. Occasionally they are found to cross the line of the shore, and to sweep over the land that opposes their progress, as appears to be generally the case in the East Indies ; but by far the greater number seem to be repelled by any continental coast, so as to be deflected back to the N.E. in the N. hemisphere, and to the S.E. on the other side of the Equator. The Atlantic storms, for instance, almost always wheel round to the N. in the Mexican Gulf, and follow the sea-board of North America.

Vortex. Another remarkable feature of these storms is their increasing violence in the

neighbourhood of their centre or vortex; and yet there, they are so much the more fitful and uncertain as to render a vessel absolutely helpless and unmanageable. Besides which, as she approaches the vortex (unless on the direct line of its own progressive motion), the more rapid become the changes of the wind till at length, instead of veering point by point, as she had found when entering the storm-field, it now flies round at once to the opposite point—the vessel is taken aback, or brought by the lee, in an irresistible squall—and forced into sternway against an overpowering sea, the destructive consequences of which need not be enlarged upon here.

Those who have dearly bought this experience, by having passed through the centre of one of these storms, describe the cross confused sea there as being tremendous—raised by gusts from every point of the compass into pyramidal heaps, which strike the vessel on either side, and with a force similar to that of a heavy surf beating over a reef. And yet, on the other hand, there are instances on record of the wind suddenly failing in the very vortex, and the clouds dispersing for a short and delusive interval, though soon, as if the wind had acquired fresh power from the transient calm, resuming its violence with tenfold fury. It may be added, that few vessels ever went through the ordeal of the vortex without losing either masts or rudder, or meeting with some worse disaster; and, therefore, at whatever cost of time, trouble, or loss of ground, the central part of the storm-field will be avoided by every man in his senses.

A few simple rules are given here, by which Cyclones may be either wholly avoided; or by which, if the vessel be already too near to prevent the collision altogether, she may place herself so as to receive them in the least disadvantageous position and to extricate herself speedily.

Prognostics. With that threatening aspect of the sky which generally precedes all storms,—such as the greasy halo round the sun or moon, the rolled and tufted forms of the clouds, with their lurid streams of light and extraordinary colours, and the heavy bank clinging to the horizon with its darting forks and threads of pale lightning,—every seaman is acquainted. The best and surest of all warnings will, however, be found in that invaluable and seldom-failing monitor, the **barometer**; the language of which, in the torrid zone, is unmistakeable, because there, it is usually so tranquil and undisturbed. When any such warning symptoms are observed in *any* quarter of the world it may be supposed that no time will be lost in making all due preparation, and especially if to such menacing appearances be added the confused and troubled agitation of the sea which often precedes these revolving storms, and always shows that they are at no great distance. But, if these combined prognostics should occur, within the limits of *those regions* which have been pointed out as the hot-bed of Cyclones, let the seaman immediately consider the possibility at least of his being about to encounter a storm of that revolving type of which we have been treating.

Revolution. Acting under this anticipation, his first care should be to discover the position of the storm with respect to the vessel, or, in other words, to ascertain its bearing. Fortunately this is a problem of extreme facility, for, as we have already stated, it is one of the remarkable laws of these storms that in opposite hemispheres they revolve in opposite directions—in *North* latitudes against the course of the sun, that is to say, from right to left, or in a direction *contrary* to the movement of the hands of a watch, and in *South* latitudes from left to right; and secondly, it is known that, no matter how great or how little may be the size of the storm-field, the wind continually blows in a circular course round and round a centre or vortex. It therefore follows that this centre must always be at right angles to that circular course; or, in other words, that the bearing of the centre lies 8 points of the compass from the direction of the wind. Now, these two considerations are quite enough for our purpose, for they enable us to answer the question instantly and certainly by the following general rule:—

Rule. Look to the wind's eye,—set its bearing by the compass,—take the 8th point to the right thereof—and that will be the bearing of the centre of the storm if in *N.* latitude; or if in *S.* latitude, the 8th point to the *left* of the direction of the wind. For example: suppose the vessel to be in 14° *N.* latitude, the wind from E.S.E., and the barometer and sky indicating a coming gale,—then, look at the compass, take the 8th point to the right of E.S.E., and S.S.W. will infallibly be the bearing of the brewing storm, *if it be* of a revolving type. Or, under similar appearances of the weather in 14° *S.* latitude, with the wind S.W., take 8 points to the left of S.W., and S.E. will consequently be the direction of the centre of the impending gale. In the former case, the vessel will be on the *N.* edge of the storm-field; and in the latter, she will be somewhere in its *N.W.* segment. Nothing can be more unambiguous than the above rule—requiring no diagrams nor any puzzling considerations to lead to a distinct and immediate conclusion; nevertheless, as the mind, when somewhat excited by the approach of such an unwelcome visitor as one of these storms, might possibly apply the eight points on the wrong side, we have added two tables, one for *N.* latitude, and one for *S.* latitude, in which the seaman will at once see the question solved without the trouble of any reflection whatever.

TABLE 1.—BEARING OF THE VORTEX
IN NORTH LATITUDES.TABLE 2.—BEARING OF THE VORTEX
IN SOUTH LATITUDES.

If the Wind be	The Vortex of the Storm will bear from the Ship,	If the Wind be,	The vortex of the Storm will bear from the Ship,
North.	East.	North.	West.
N. by E.	E. by S.	N. by E.	W. by N.
N.N.E.	E.S.E.	N.N.E.	W.N.W.
N.E. by N.	S.E. by E.	N.E. by N.	N.W. by W.
N.E.	S.E.	N.E.	N.W.
N.E. by E.	S.E. by S.	N.E. by E.	N.W. by N.
E.N.E.	S.S.E.	E.N.E.	N.N.W.
E. by N.	S. by E.	E. by N.	N. by W.
East.	South.	East.	North.
E. by S.	S. by W.	E. by S.	N. by E.
E.S.E.	S.S.W.	E.S.E.	N.N.E.
S.E. by E.	S. W. by S.	S.E. by E.	N.E. by N.
S.E.	S.W.	S.E.	N.E.
S.E. by S.	S.W. by W.	S.E. by S.	N.E. by E.
S.S.E.	W.S.W.	S.S.E.	E.N.E.
S. by E.	W. by S.	S. by E.	E. by N.
South.	West.	South.	East.
S. by W.	W. by N.	S. by W.	E. by S.
S.S.W.	W.N.W.	S.S.W.	E.S.E.
S.W. by S.	N.W. by W.	S.W. by S.	S.E. by E.
S.W.	N.W.	S.W.	S.E.
S.W. by W.	N.W. by N.	S.W. by W.	S.E. by S.
W.S.W.	N.N.W.	W.S.W.	S.S.E.
W. by S.	N. by W.	W. by S.	S. by E.
West.	North.	West.	South.
W. by N.	N. by E.	W. by N.	S. by W.
W.N.W.	N.N.E.	W.N.W.	S.S.W.
N.W. by W.	N.E. by N.	N.W. by W.	S.W. by S.
N.W.	N.E.	N.W.	S.W.
N.W. by N.	N.E. by E.	N.W. by N.	S.W. by W.
N.N.W.	E.N.E.	N.N.W.	W.S.W.
N. by W.	E. by N.	N. by W.	W. by S.

The bearing of the storm from the vessel having thus been determined, it would no doubt be very desirable to ascertain, at the same time, its distance from her; but for this no very clear rules have yet been suggested. A good guess may however be made from the quickness or slowness with which the storm appears to develop itself,—from the increasing severity of its squalls,—from the faster veering of the wind,—from the rising confusion of a cross swell,—and especially from the sudden fluctuations of the barometer, which should be carefully noted every quarter of an hour whenever there is reason to suspect that a revolving storm is in the neighbourhood.

It is necessary that the seaman should clearly perceive that the changes of wind which occur to him in any part of the storm-field entirely depend on the relative position of his ship to the vortex; and moreover that they may be correctly foreseen, and ought to be well considered before he can determine on what measures to adopt,—whether to lie-to, or to fly from the danger,—whether to avoid further entanglement with its vicious circles, or to endeavour to render them subservient to the progress of her voyage.

The General Rule for all vessels, in all cases, except when controlled by land or shoals, is this. Let them immediately steer in that direction which will most quickly increase their distance from the vortex, or centre of the storm-field. But then let it be remembered, that the whole storm-field is itself in motion; that it is travelling with certainty to the westward, while within the tropics, though with very uncertain velocity; and that it has a tendency to curve round to the N. in N. latitudes, or to the S. in S. latitudes when leaving the tropics. The situation of the vessel must therefore be considered, not only with respect to the present position of the vortex, but also with respect to the place to which it will have advanced by the time she may have executed any projected run; for otherwise, though going at her best speed, she might be overtaken by a following, and probably an expanding, storm. When the progressive velocity of a storm is slow, a vessel may overtake and plunge into it; in which case the cross sea that follows in the "*wake*" of the storm may serve as a warning.

As the latter half of a storm-field is often pregnant with far greater mischief than the preceding half, and as it is generally attended by a much more turbulent sea, so a prudent commander (in the N. hemisphere) would have led her off, with the wind on the *starboard* quarter, so that she might go to the N., although perhaps she were bound to the S. Or, if the wind or sea were not quite intolerable, he might possibly lie-to on the *starboard* tack; being certain that, as the vortex was going off to the W.N.W., it would bear from him more and more Westerly, and consequently that his vessel would keep *coming up* to the wind without any danger of being taken aback in some of its sudden changes; this being a very material consideration in dealing with these changeful storms.

In the S. hemisphere, she should run with the wind on the *port* quarter, or lie-to on the *port* tack; thus also she would *come up* to the wind.

The Southern Indian Ocean, which includes the Mauritius, and stretches from Madagascar to about 110° of E. longitude, is prolific of revolving storms. So frequent and numerous are they in this region, that it is upon record that three separate ones have been blowing in different parts of it at the same time. Their tracks also are variable, as well as the rate at which they travel, but generally their line of movement is from E.N.E. to W.S.W. Let us then imagine two vessels, A and B, in company, homeward-bound, to be crossing that zone with the wind from E.S.E., and that both are startled some evening by those threatening appearances in the sky which, with a rapidly falling barometer and a growing agitation of the sea, too surely indicate the approach of bad weather. Looking towards the E.S.E., and taking eight points to the *left* thereof (being in *South* latitude, see Table 2), they both quickly infer that the vortex of the coming storm bears N.N.E.; but A, anxious to profit by the freshening gale, persists in her course, and before morning is taken aback in a crushing gust of wind, with a mountainous sea, and discovers too late the truth of the old proverb that "most haste makes worst speed." Whereas B, warned by experience, and alarmed by the continued depression of the barometer, hauls out to the S. by W., keeping as much way on the ship as the snug sail (to which she has been wisely reduced) will permit; and when about sunrise she receives a pretty severe brush of the gale she quietly heaves-to, knowing by the direction of the wind, which had drawn *aft* to E.N.E., that the main body of the storm having already passed her is then bearing N.N.W.; and that, owing to her prudent Southern board, she had so considerably increased her distance from it, that there was then no immediate danger. In time, the barometer looks upward, the wind moderates, the sea gradually subsides, and she pursues her voyage.

Anomalies in all these laws. We have thus given a sketch of the general laws by which revolving storms appear to be guided, as well as of the general principles on which they may be avoided; and we have endeavoured to do this with the utmost brevity, because our principal object has been to awaken the seaman to the extreme importance of the subject, and to show the nature of the resources which prudence and foresight will place in his hands. But it is our duty to warn him that he must acquire a much more efficient knowledge than can be gathered from this little Abstract of the leading phenomena which distinguish these storms; and he must also study their various anomalies and exceptions, for they have been known suddenly to intermit, and even to back round again in a contrary direction to their usual course; and sometimes to be followed by a second storm, leaving a narrow intermediate space between their two circular areas, where a vessel has been alternately affected by each of them. These, and other highly interesting facts, he will find narrated and classed in the books which we have mentioned, which we again therefore recommend to his careful study.

WHIRLWINDS are sometimes occasioned by high uneven land: when the wind is blowing strong, gusts from the mountains descend sometimes with a spiral or whirling motion upon the surface of the contiguous sea. But the phenomenon usually known by the name of *Whirlwind* when seen upon land, and called a *Water-spout* when it happens at sea, is generally attributed to elec-

trical causes; as it occurs mostly in warm climates, when black dense clouds appear low in the atmosphere, which, being highly charged with electric fluid, thunder or lightning is mostly experienced with a whirlwind; and at sea, it is almost invariably accompanied by rain and hail.

When a water-spout is forming at a small distance, a portion of a dense cloud is observed to descend and stretch itself towards the sea in a conical shape; at the same time the surface of the sea immediately under it is agitated, and ascends a little way, in the form of steam, or white vapour, from the centre of which a small cone proceeding upwards unites with that projected from the cloud; the water-spout is then formed; frequently, however, the acting cause is not adequate to its completion; in which case the half-formed water-spout soon disperses.

There is in the middle of the cone that forms a water-spout a white transparent tube or column, which, when viewed at a distance, seems like a stream of water ascending, and gives it a very threatening aspect; but when closely approached, this partly vanishes: I have passed close to several water-spouts, and through the vortex of some that were forming, and was enabled to make the following observations:

By an electrical force, or *ascending* whirlwind, a circular motion is given to a small part of the surface of the sea, in which the water breaks, and afterwards acquires a whirling motion with a velocity of 2, 3, to 4 or 5 knots. At the same time a considerable portion of the water in the whirlpool is separated from the surface in minute particles, resembling smoke or vapour, accompanied by a hissing noise, from the strength of the whirlwind: these particles continue to ascend with a spiral motion to the impending cloud. In the centre of the water spout there is probably a calm, in which none of the small particles of water ascend; and in this, as well as around the outer edges of the water-spout, large drops of rain fall, because in those places the power of the whirlwind is not sufficient to support the ascending particles.

The vacant space in the centre of the water-spout seems, when viewed at a distance, to be that which has a white transparent appearance, like a column of water, or a hollow glass tube. In calm weather, water-spouts are generally perpendicular, but occasionally they have an oblique or curved direction, according to the progressive motion given them by the prevailing winds. Sometimes they disperse suddenly, at other times they move rapidly along the surface of the sea, and continue a quarter of an hour or more before they disappear.

Water-spouts are seldom seen in the night; yet I once passed near to a large one in a cloudy dark night. The danger from water-spouts is not so great as many persons apprehend, for it has been said, that when they break, a large body of water descends, sufficient to sink any ship. This does not appear to be the case, for the water descends only in the form of heavy rain, where it is broken from the ascending whirlwind; but there is danger of boats being swamped, or in small vessels of being upset when carrying much sail; and large ships, if their top-sails are not clewed up, and the yards secured, may be liable to have them carried up to the mast-heads by the force of the whirlwind, and thereby lose their masts. It is sometimes thought that the firing of a gun when near a water-spout will break it, and effect a dispersion; the concussion produced in the atmosphere by the explosion destroying in such case the cohesive force of the whirlwind. In the vicinity of water-spouts the wind is subject to fly all round in sudden gusts, rendering it prudent for ships to take in their square sails.

When a whirlwind happens on land, all the light substances on the surface of the earth within its course are carried up in a spiral motion by it. I have observed one pass over Canton River, in which the water ascended like a water-spout at sea, and some of the ships that were moored near its path were suddenly turned round by its influence. After passing over the river, it was observed to strip many trees of their leaves, which, with the light covering of some of the houses or sheds, it carried up a considerable way into the atmosphere.

THE MARINE BAROMETER is a very useful instrument, especially in high latitudes, in assisting navigators to anticipate approaching storms. Previous to a hard gale of wind, there is generally a great fall of the mercury, and even near the tropics, the fall of it before a storm or hurricane is usually considerable. Within 9° or 10° of the Equator, there seldom or never is a hurricane or storm of long duration; but whirlwinds, and hard squalls of a few hours' continuance, are sometimes experienced within these parallels, without any fall of the mercury. Indeed, the barometer is of little use as a guide in prognosticating storms which may happen within the tropics; except that before a severe hurricane there is often a considerable fall of the mercury, when the latitude is not less than 14° or 15° N. or S.

In high latitudes, the motion of the mercury in the barometer, like the winds, is mutable and uncertain; but previous to a storm or gale of wind, there is commonly a great fall, and the mercury begins to rise before the conclusion of the gale, sometimes even at its commencement, as the equilibrium in the atmosphere begins to be restored.

Although the mercury sinks lowest before high winds, it frequently sinks considerably before a heavy fall of rain; and when the mercury stands low, the air is light, and deprived of expansibility or elasticity, therefore not capable of supporting much gaseous moisture: at such periods, consequently, rain generally falls. The mercury also sinks on the approach of thunder and lightning, or when the atmosphere is highly charged with electric matter.

In serene settled weather, the mercury commonly stands high, also in clear frosty weather. The mercury, in the open sea, is generally inclined to rise with Easterly, and fall with Westerly winds. It is likewise necessary to remember, that in the N. hemisphere, in the open sea, the mercury rises with Northerly and falls with Southerly winds; because the former, coming from the frozen parts near the pole, are more dense than the latter, which blow from the equatorial regions. In the S. hemisphere, the contrary takes place, for there the mercury rises with the cold Southerly winds, and falls with Northerly winds. These effects are more particularly observed in high latitudes in the ocean, for obstructions and irregularities will always happen near land; because there, the rarefaction and expansibility of the atmosphere are not so equal as over the ocean. After very warm and calm weather, in winter particularly, a storm is likely to follow; or at any time that the atmosphere is greatly heated above the medium temperature.

It is proper to observe, that in the open ocean between the tropics, in settled weather, there is a *flux* and *reflux* in the atmosphere *twice* every 24 hours, resembling the tides of the sea; but these atmospheric tides depend upon the sun's influence and the rotation of the earth, and do not follow the motion of the moon. The rise and fall of the mercury, in consequence of these tides, is about 6 or 7 hundredths of an inch, in settled weather, near the Equator; the high station happening about 10 o'clock in the morning and 10 o'clock at night, and the low station about 4 o'clock in the morning and evening. The regularity of this flux and reflux of the atmosphere is obstructed by land, but in the ocean it prevails to lat. 26° North and South; and in fine steady weather it may be perceived as far as lat. 30° or 32° North or South.

By proper attention to the barometer, the experienced navigator may often be enabled to anticipate changes of weather; and, in some seas, he may by its indications even take in or let out reefs in the night.

The LUMINOUS APPEARANCE of the SEA, which frequently happens, more particularly between the tropics, or near them, in different parts of the globe, is produced from various causes, not generally known to navigators; although it has been noticed by Aristotle and Pliny, and by several naturalists in different ages since their time. Various kinds of marine animals emit light, but although the luminous appearance of the sea is generally produced by living animals, nevertheless some kinds of dead matter seem to give it a similar aspect at times; such as the exuviae of fishes, or putrefactions. I have sometimes carefully examined the water of the sea when it was luminous, and could not discern any animation, but it appeared only to contain small particles of matter of a *dusky straw-colour*, which dissolved with the slightest touch of the finger; at other times the sea was evidently illuminated by small sparkling animals.

A peculiar phenomenon is sometimes seen in the Banda Sea, and other parts of the Eastern seas; and particularly in the Arabian Sea, between the east coast of Africa and the coast of Malabar, during the rainy monsoon. This I had an opportunity of observing at midnight, when the weather was cloudy, and the sea particularly dark; but it suddenly changed to a white flaming colour all round. This phenomenon bore no resemblance to the sparkling or glowing appearance observed on other occasions in seas near the Equator, but the sea was of a splendid colour, white as milk, which did not continue more than ten minutes, when it resumed its former darkness. This singular phenomenon has been also observed by several persons near the Malabar Coast, and in other parts, and it appears to be in a great degree elucidated by the observations of Mr. Langstaff, made in a passage from Port Jackson toward China. About half an hour after sunset, the sea changed to milky appearance, and the ship seemed to be surrounded by ice covered with snow. A bucket of water being hauled up, and examined in the dark, a great number of globular bodies were discovered, *linked together*, each about the size of a pin's head: the chains thus formed did not exceed three inches in length, and emitted a pale phosphoric light. This extraordinary appearance of the sea was visible two nights; but as soon as the moon exerted her influence, the sea resumed its natural dark colour, and exhibited *distinct glittering spots*, as at other times. Mr. Langstaff's observations seem to show that the diffused light of the sea is produced by an assemblage of minute medusæ on the surface of the water.

The surface of the sea is usually more subject to be luminous after long calms and sultry weather than at any other time; for then it abounds with minute medusæ and small marine animals, generated in calm weather, which render it foetid both to the smell and taste. At such times the sea becomes easily illuminated by the least disturbance of a squall, or anything that produces

agitation or friction on its surface. The porpoise, dolphin, dorado, and other fishes, therefore, often reflect a vivid light when swimming near the surface, which has induced some persons to ascribe the property of emitting light to several fishes; but upon close examination, the bodies of those fishes were found to be covered with minute spherical particles, which adhere to their surface, apparently the same that illuminated the whole of the sea at the time, and in all probability were a minute kind of medusæ.

A beautiful illumination of the surface of the sea is sometimes reflected from the broken water or waves at the head of a ship, occasioned by her velocity through the fluid, when it abounds with those animals which emit light. Once I perceived a splendid instance of this kind near the Equator, when the quantity of gleaming light reflected from the waves under the weather bow of the ship, against the white fore-sail, was sufficient to enable me to read any pages of a book, if not printed with a very small type, although the night was otherwise dark at the time.

The **TEMPERATURE** of the **SEA** is a phenomenon hitherto but little investigated, although it appears to be closely connected with the improvement of nautical science. It used to be thought that the temperature of the ocean was subject to little variation, particularly between the tropics; the temperature of its surface, however, is affected by changes of the superincumbent atmosphere, as well as by other local or adventitious causes.

1st. When the atmosphere has a low temperature, a portion of its cold is imparted to the surface of the ocean, by which the temperature of the water is diminished.

2nd. Tempestuous weather raises the temperature of the sea: an effect which is *probably* produced by the agitation or friction of the broken waves, the particles of water rubbing against each other.

3rd. Currents have a more powerful influence than any other cause in changing the temperature of the surface of the ocean; and it may be here observed, that the same rule is applicable in this case as that already stated in regard to winds, under the articles *Trade Winds* and *Marine Barometer*; viz., That in either hemisphere a current proceeding from the cold polar regions towards the Equator, diminishes the temperature of the sea; whereas a current running from the inter-tropical regions towards either pole, raises its temperature. It is surprising how long the great bodies of currents preserve their original temperature: that known by the name of the Gulf Stream loses only two degrees of its original warmth in running 1,300 miles into a cooler climate, it being 81° in summer in lat. 39° N.; and in passing the bank of Newfoundland, it is several degrees warmer than the sea in its vicinity; thus the experienced navigator is enabled to ascertain when he gets into the Gulf Stream, merely by drawing a bucket of water and feeling its temperature.

In calm and settled weather, the temperature of the sea was found by Dr. John Davy to reach its maximum about one or two hours after noon, and its minimum about sunrise. Were the temperature of the sea, as well as that of the atmosphere, conjointly registered in the journals of navigators, several times every twenty-four hours, it would assist greatly the improvement of nautical science; and the proximity of land or shoal banks might *probably* be ascertained by carefully observing the temperature of the sea.

The late Captain J. P. Wilson, of the Company's ship *Hythe*, a very scientific officer, ascertained by careful observation, that the temperature of the *central* part of the stream of Westerly current which prevails along the verge of Cape Agulhas Bank, is about 8° or 9° higher than that of the sea beyond the limits of the stream of current; and as the maximum of temperature is in the middle of the stream of current, a ship may be kept in it, by attending to changes of temperature in the surface water, and thereby be enabled to accelerate her progress to the westward during adverse winds.

TERRESTRIAL MAGNETISM.

Terrestrial Magnetism is one of the phenomena of nature that for a considerable time has received much and deserved attention at the hands of science; and although the time appears distant at which the true physical theory may be established, still the mass of observations accumulated during the last quarter of a century have laid a secure foundation for this great object. The magnetic condition of our globe is manifested at its surface by the three elements known as the *Variation*, *Dip*, and *Intensity*:—the two former terms are, however, seldom used in scientific discussions, having given way to the modern appellations of *Magnetic Declination* and *Inclination*. The original and more simple names, which are familiar to every sailor, are retained in this brief treatise.

Magnetic Variation is the amount by which the pointing of the compass needle varies horizontally from the true geographical North. The **Magnetic Dip** is the angle of inclination to the

horizon of a freely suspended needle, not limited in motion only to the horizontal plane, as is the compass needle. The **Intensity** is the amount of magnetic force acting on the freely suspended needle, and giving it its direction:—for convenience, this element may be resolved into two components, one acting in the horizontal, the other in a vertical direction. The forces are then distinguished as the **Total or Absolute, Horizontal and Vertical.**

The changes to which the earth's magnetism is subject, are classed as *periodical, secular, and irregular.* The **periodical changes** are denoted by certain regular movements of the needle occurring in short intervals; as, for example, the diurnal changes of the Variation, amounting in Europe to 12' or 15', and apparently governed by the sun whilst above the horizon at any place. The **secular changes** are either slowly progressive, or run through a certain course, the elements returning finally to their former values, in periods of great and uncertain magnitude; thus, between the years 1657 and 1660, the compass needle at London did not sensibly deviate from the true meridian; in 1665 the direction was about $1\frac{1}{2}^{\circ}$ W. of the meridian, and this Westerly Variation went on increasing to the year 1818, when the maximum, $24^{\circ} 21'$ was attained, since which time the needle has been gradually approaching the true meridian, and was in the year 1863, about $20^{\circ} 50'$ W. The **irregular changes** are such as *apparently* follow no uniform course, and are uncontrolled by any law. The most remarkable of these changes are known as "*magnetic disturbances, or storms,*" during which the needle is affected by a shivering motion, and oscillates largely on either side of its mean position. These perturbations manifest themselves often simultaneously over land and sea, embracing vast areas: one of the most remarkable (Sept. 25th, 1841) was observed at Toronto in Canada, at Prague, the Cape of Good Hope, and at Van Diemen's Land.

Our countryman Halley was the first person who appears to have taken a correct view of the system of terrestrial magnetism; he considered that the variation and dip of the needle could not be consistently accounted for on the supposition of the earth having only one magnetic axis and two magnetic poles, and inferred that two magnetic poles must exist in each hemisphere of the globe,—the one fixed and the other in motion,—in order to account for the discordant magnetic changes. To Halley we are also indebted for the earliest variation chart, published in 1701, on his return from a voyage in the Atlantic Ocean in a ship of war furnished by William III. Collecting a large number of observations, he marked on a chart of the world all those places where the magnetic and true meridians coincided, and connecting them by a line, obtained the curve, or line of no variation; pursuing a similar course for those places where the angular differences between the magnetic and true meridians were equal in amount, the courses and system of the variation lines were clearly traced out. Halley's variation chart underwent revision in 1744 and 1756-7, and since that time various others have been contributed by men of science; later productions comprehend also the Dip and Intensity, and are therefore, properly, general magnetic charts.

A **variation chart** of the world for the epoch 1858, by Frederick J. Evans, Master R.N., F.R.S., was published by the Hydrographic Office; and revised editions have followed to the present year; it has no equal. This chart is especially used for the navigation of iron-built ships. as the seaman, by observing azimuths of the sun, or other heavenly body, and comparing the variation of his compass so determined, with the known variation of the chart, can detect any changes in the deviation of the compass. The Admiralty Manual of the Deviation of the Compass* comprises charts of the lines of equal dip and equal horizontal intensity.

The **Variation of the Needle**, as before alluded to, is in most parts of the globe undergoing continual change, partaking of an *annual* as well as a *diurnal* variation. The latter follows a general law in either hemisphere: in the N., the movement of the N. pole of the needle from about 8 A.M. to 1 P.M. is from E. to W.; it then becomes stationary, and with a slow motion retrogrades to the E., arriving at the original point about 10 P.M., a smaller oscillation being observed during the night; the movement in the S. hemisphere is reversed in direction. The amount in angular value varies in different latitudes, and according to the seasons; in Northern Europe it attains 15' or 17'. The **annual change** varies in different regions; at the present time in Great Britain the average decrease is about 7'. On the E. coasts of America, nearly in the same parallel, it appears to be increasing by a similar amount. At Bombay, Madras, and in Eastern India generally, the annual changes are remarkably small, whilst in the Red Sea the annual decrease during the present century has averaged 4 to 5 minutes.

* As an introduction and companion to the Admiralty Manual, we strongly recommend Staff-Captain Evans' *Elementary Manual for the Deviations of the Compass in Iron Ships.* Published by J. D. Potter, 81, Poultry, and at 11, King Street, Tower Hill, London.

TABLE

Of the Variation of Compass at different epochs, for a few places within the limits of this work, appended as an instructive example of secular changes.

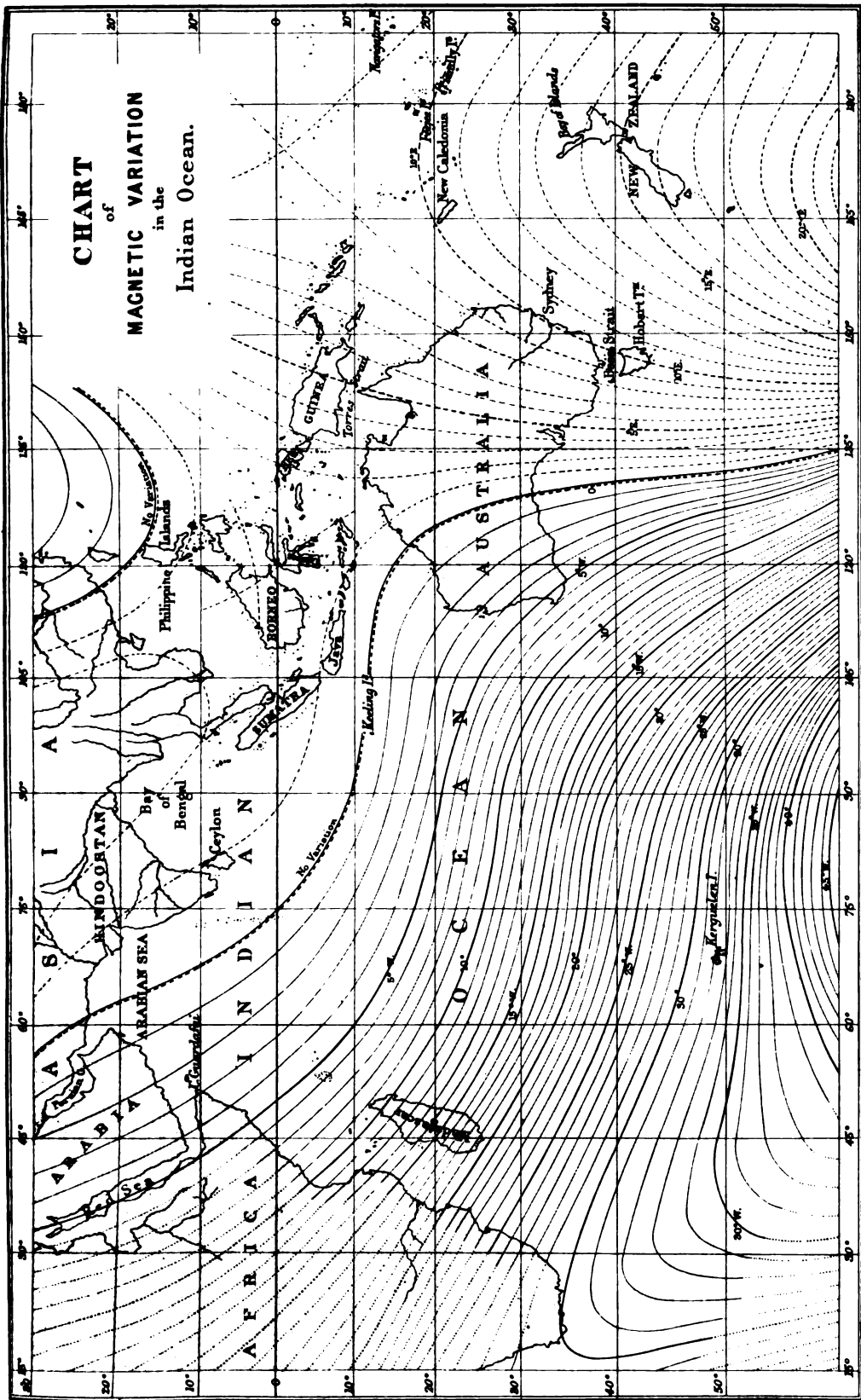
London	{	1680	...	11	17 E.	Bombay ...	{	1722	...	5	7 W.		
		1692	...	6	12 E.			1751	...	5	12 W.		
		1662	...	0	0			1817	...	0	0		
		1720	...	13	0 W.			1859	...	0	20 E.		
		1760	...	19	30 W.			Maskat	{	1728	...	10	30 W.
		1806	...	24	8 W.					1785	...	6	0 W.
		1818	...	24	41 W. Max.					1824	...	2	7 W.
		1831	...	24	0 W.					1858	...	0	40 W.
1845	...	22	55 W.	Bushire.....	{	1765	...	7	30 W.				
1863	...	20	50 W.			1786	...	7	15 W.				
St. Helena	{	1691	...			1	0 W.	1827	...	4	12 W.		
		1793	...			15	28 W.	1857	...	1	15 W.		
		1815	...			17	30 W.	Aden.....	{	1723	...	13	50 W.
		1824	...	19	34 W.	1800	...			8	49 W.		
		1845	...	23	28 W.	1857	...			4	20 W.		
Cape of Good Hope	{	1609	...	0	12 W.	Macao	{	1616	...	1	30 W.		
		1702	...	12	50 W.			1779	...	0	32 W.		
		1724	...	16	27 W.			1841	...	0	35 E.		
		1792	...	24	30 W.	Sydney, New South Wales	{	1793	...	8	46 E.		
		1841	...	29	7 W.			1813	...	8	47 E.		
1850	...	29	20 W.	1824	...			8	56 E.				
1857	...	29	34 W.	1843	...			9	44 E.				
Mauritius ...	{	1805	...	11	42 W.			1849	...	10	9 E.		
		1813	...	16	40 W.								
		1824	...	13	46 W.								
		1836	...	11	18 W.								
		1858	...	9	45 W.								

The Dip of the Needle engages but little the attention of seamen, though it is familiar to them that the compass needle does not retain its horizontality on great changes of latitude, excepting through the medium of *adjusting weights*. As the dip is an important element in the consideration of the changes of the magnetic condition of all vessels, whether wood or iron built, a brief account of its nature and distribution is added. It has been already observed that the term **magnetic poles** is applied to those positions on the surface of the earth where the horizontal force disappears and a freely suspended needle becomes vertical; the end of the needle which points downward in one hemisphere pointing upward in the other. In like manner the term **magnetic equator** is applied to those places where the needle has no inclination or dip, but rests in a horizontal direction: this line of no dip is irregular, cutting the geographical Equator in two points, one on the meridian of Greenwich, and the other in about 170° E. longitude.

The dip increases gradually on either side of the magnetic Equator, and the lines of equal amount are nearly parallel to it till within the vicinity of the magnetic poles. A ship sailing along one of the lines of equal dip, is said to remain in the same magnetic latitude, and she changes her magnetic latitude most rapidly when her course is at right angles to those lines.

The dip, like the variation, is subject to secular change; the annual decrease in the British Islands, and over a great part of Europe, has averaged for several years past, about 3'; in the South Atlantic Ocean it is increasing 6' annually; the hourly variation is very small.

CHART of **MAGNETIC VARIATION** in the **Indian Ocean.**



Subjoined is the amount of dip (1859) at several stations within the limits of this work:—

London.....	68° 35' N.	St. Helena	29° 17' S.	Singapore	13° 18' S.
Cape de Verde Islands	45° 0' N.	Cape of Good Hope	54° 30' S.	Sydney, N. S. W..	62° 45' S.
Ascension.....	1° 30' N.	Mauritius	54° 0' S.	Hobarton	70° 36' S.
Rio de Janeiro.....	12° 30' S.	Bombay	19° 15' S.		

Having thus briefly noticed those principles and elements of terrestrial magnetism necessary for a correct appreciation of so important a branch of knowledge, it will be necessary to direct the seaman's attention to the immediate practical subject of the *local attraction*, or, in other words, the deviation of the compass caused by the iron in a ship.

The **DEVIATION of the COMPASS** is a subject which of late years has received ample attention from our most celebrated navigators, mathematicians, and men of science: of the former, Flinders, Parry, James Ross, Fitzroy, and Scoresby, must be especially noted; whilst the labours of Airy, Sabine, Harris, Johnson, and A. Smith, in the field of theory, have given the subject a popular and practical direction.

The uncertainty of the amount of local deviation in a ship, and the necessity of determining or making compensation for its amount, are facts now so universally admitted, that it is unnecessary to adduce proofs, or to direct attention to the disastrous consequences of its neglect. But before giving the best practical methods for determining the amount and its application, it is well to offer a few general propositions, based on observation and experiment, and to explain the varying character of local deviation, and its dependence on certain magnetic laws.

1st. That the compasses of all ships, whether built of wood or iron, are liable to a greater or less degree of deviation; but that, in iron ships generally, larger deviations and more variable conditions exist. The most remarkable of these conditions are, that in iron built ships the neutral points approximate to those points of the compass to which the ship's head and stern were directed in building, the deviation being Easterly when *the part of the ship which was S. in building* is E., and Westerly when it is W. It follows from this that in an iron ship built head North, the deviations will be *Westerly* when the ship's head is to the E., and *Easterly* when the ship's head is to the W. This being opposite to what is generally found in wood-built ships in N. latitudes is often a source of perplexity to the seaman.

2nd. That the amount of deviation in one ship is no guide to the amount in another vessel.

3rd. That these errors are subject to change, on a change of geographic position, but especially of magnetic latitude; and may change, from extraneous circumstances, without a change of latitude.

4th. The changes which the deviations undergo on a change of geographic position differ according to the structure of the vessel. In wooden vessels the deviations are dependent on the amount of the magnetic dip (varying directly as its *tangent*), diminishing as the magnetic Equator is approached, and change their direction on attaining a S. magnetic latitude; the deviations do not however vanish in changing from the one direction to the other, but near the magnetic Equator have four zero points when the ship's head is on or near the magnetic cardinal points, two Easterly maxima when on or near N.E. or S.W., and two Westerly maxima when on or near S.E. and N.W. In iron vessels, where the standard or azimuth compass is in a position removed from vertical bars or masses of iron, the change is dependent on the changes of the earth's magnetic *horizontal* force (varying *inversely* as the horizontal force), in addition to the dip; as the influence, however, of the first of these elements preponderates in most vessels, the deviations generally retain the same direction in both hemispheres, though varying in amount.

5th. Experience has also shown that the deviations in iron vessels are affected by the *heeling* of the ship; the magnitude of the error so resulting depending on the amount of heel, and to some extent on the value of the deviations observed while the ship was on an even keel, as also on the original direction of the ship's head in building; but in general the *maximum* disturbance (or *List-deviation*) when heeling will be found when the ship's head is *North* or *South* by the observing compass, the disturbance vanishing when the ship's head is *East* or *West* by the observing compass.

Explanation.—The iron entering into the composition of a vessel and her fittings varies between the two conditions of hard and soft: in wooden vessels the soft predominates; in iron ships we have hard iron in the rolled and hammered plates forming the hull.

Soft iron becomes instantly magnetic by *induction*, (or is *induced* to become magnetic), when exposed to the influence of the earth or any other magnetic body, and as quickly loses its magnetism when the influence is removed. Hard iron does not, under ordinary circumstances, become magnetic by induction; but when magnetized, it *retains* the magnetic power even after the

influencing body is removed: its magnetism has therefore received the term "*permanent*," whilst that of soft iron has received the term "*induced*."*

It will be readily conceived that much of the iron of a ship must be in an intermediate state, between the two extremes of "*hard*" and "*soft*;" the magnetism of this portion has been named "*sub-permanent*," or "*retentive*," and the condition of this magnetism appears to be that it is liable to change from blows, or straining of the vessel, as also slowly and gradually when the vessel changes her magnetic latitude.

The nature of the change in the deviation produced by the *permanent* and *induced* magnetism respectively, on a change of magnetic latitude, is this:—"The first varies inversely as the horizontal force; the second varies as the tangent of the dip; their changes in different magnetic latitudes may be thus described: at a magnetic pole of the earth, when the dip is 90° , and the horizontal force zero, each part becomes infinite:—this indicates that there is then no directive force.

"For some distance from the magnetic pole, the two parts change nearly at the same rate, and therefore the whole varies nearly as the tangent of the dip. But as we approach the magnetic equator, the part which arises from the soft iron diminishes the most rapidly. It becomes zero at the Equator, and in S. magnetic latitudes has the *same* value as in corresponding N. magnetic latitudes, but the *opposite* sign. The part which arises from the hard iron does not become zero at the magnetic equator, but becomes a minimum at that line, nearly coincident with the magnetic equator, at which the horizontal force is a maximum, and in S. magnetic latitudes it has the same sign and nearly the same value as in N. latitudes.

"If the hypothesis that all the iron is perfectly hard or perfectly soft were strictly true, it would be possible by observations made in any two magnetic latitudes to determine the values of the two parts separately. But, in fact, this is impossible. The *sub-permanent* or *retentive* magnetism, causes the changes in the magnetism of a ship to depend not only on the place at which the ship is, but on the places in which she has been for some preceding days or weeks; her magnetism being thus in arrear of its theoretical amount, to an extent which there appears to be no means of estimating."

It has been established by recent investigations, that a change takes place in a newly-launched iron vessel, even without a change of magnetic latitude; but generally that after a few months' sea service, no further change of any importance takes place without a change of magnetic latitude.

Mechanical Correction. From the preceding details it is evident that the question of the deviation of the compass is very complicated, and hence the unceasing experiments and investigations to neutralize its causes by *mechanical correction*, or (in other words) employing an antagonistic influence to the iron of the ship. The general method now adopted in the mercantile navy is that introduced by the Astronomer Royal, G. B. Airy, who, from the year 1838 to the present time, has been engaged in its discussion. He considers that the deviation of the compass may be accurately corrected by placing a magnet in an *athwart-ship* direction, fixed at a distance determined by trial, for correcting the deviation when the ship's head is N. or S.; by a magnet in a *fore-and-aft* direction, also at a distance determined by trial, for correcting the deviation when the ship's head is E. or W.; and by a mass of *unmagnetized iron*, at the same level as the compass, in the athwart-ship line, or in the fore-and-aft line, according to circumstances (usually in the former), also at a distance determined by trial, for correcting the deviation when the ship's head is N.E., S.E., S.W., or N.W.

The Magnets are here employed to correct that portion of the error known as the "*polar-magnet*," or "*semicircular*" deviation (or that arising from the *permanent* magnetism of the hard iron, and that *induced* by the vertical part of the earth's force in the soft iron), and the unmagnetized iron to correct the "*quadrantal*" deviation, or that due alone to the transient magnetism *induced* in the soft iron by the horizontal part of the earth's force.

* To render this term clear, we subjoin the following description from the *Admiralty Manual*:—"The action of the earth on the N. end of the needle, is exerted in the direction called the *line of force*. This is the direction of the dipping-needle, viz., towards the magnetic N., but inclined to the horizon at an angle equal to the magnetic dip at the place—in England about 70° below the horizon.—A rod of soft iron held in the direction of the dip becomes instantly magnetic. Its S. (in England the *upper*) end becomes a S. pole, and attracts the N. end of the compass needle; its N. (in England the *lower*) end becomes a N. pole, and repels it. If the rod be inclined to the line of force, its magnetism diminishes, and when at right angles to the line of force the bar ceases to be magnetic. If the inclination of the bar to the line of force be still further increased, the end which was a N. pole, and which then repelled the N. end of the needle, becomes a S. pole, and attracts it. It follows from this, that if a rod of soft iron be in a vertical position, its upper end will in N. magnetic latitude attract the N. end of the compass needle. At the magnetic equator, the line of force of the earth is horizontal, and there a vertical rod of soft iron will not be magnetic. In S. magnetic latitudes, the line of force of the earth is inclined upwards; and in these latitudes the upper end of a vertical bar of soft iron will repel the N. end of a compass needle, and attract the S. end.

The unmagnetized iron, when adjusted, produces its due effect at all parts of the world, without ever requiring change, and the quadrantal deviation is considered thus permanently corrected. The elements of polar-magnet deviation are of course liable to changes on a change of magnetic latitude, as already noticed; but these changes may be corrected by *re-adjusting* the position of the magnets, *leaving the unmagnetized iron undisturbed*; and that the change (if there is any) in the intensity of the correcting magnets will also be corrected as to its effect on the compass by the same re-adjustment of position. For more complete detail on the subject of compensation, we must refer to Mr. Airy's valuable discussions, given in the *Philosophical Transactions* for 1839 and 1855, as also to the Reports of the Liverpool Compass Committee, 1857-61.

Many practical authorities are averse to the correction (by magnets and soft iron) of the *Standard* compass of the ship; but, from the great amount of disturbing force to which *steering* compasses are from their position generally exposed, this mechanical correction is, doubtless, for them very desirable; compasses so corrected should however never be considered as entirely compensated, but that their deviations require verification as frequently as practicable.

RULES FOR ASCERTAINING AND APPLYING THE DEVIATIONS OF COMPASS CAUSED BY THE IRON IN A SHIP.

1. Every ship should be provided with a good azimuth compass, which may be called the *Standard* compass. It should be fixed on a permanent pillar, and at such a height as to permit amplitudes and bearings to be observed with it over the bulwarks; and be also carefully placed on the mid-ship line of the quarter-deck or poop, as convenient, and as far as possible from any considerable mass of iron, such as the spindle of the capstan, chain-rigging, iron davits, &c.; and care also observed in placing the *lubber-line* directly in a fore-and-aft line of the ship.

2. In iron-built vessels, it is desirable that all the compasses, but more especially the *Standard* compass, should be raised much higher than usual above the deck; and the latter fitted so as to be readily consulted.

3. When the ship is ready for sea, with all her iron stores on board, and stowed in their proper places, as well as the moveable iron-work secured in the positions in which it is intended to remain at sea, then the deviation of the *Standard* compass from the correct magnetic meridian is to be ascertained by either of the following means: viz., by the bearing of a distant and well-defined object, or by a series of reciprocal observations. In general the former is most convenient, as requiring only one observer; and advantage can be taken of the ship *tending* to tides or winds, where time will permit, instead of employing hawsers.

To ascertain the deviations by bearing of a distant object. 1. The object selected for that purpose, should be at such a distance from the ship that the diameter of the space through which she swings shall make no sensible difference in its real bearing: thus, if at an anchor with a long scope of cable, a distance not less than from 6 to 8 m. would suffice; if at moorings or in a basin, half that distance would be sufficient.

2. If warps are employed, the ship is to be gradually swung, so as to bring her head successively on *each point* of the compass: and when steady, and after a gentle tapping of the compass-bowl to insure free action of the needle, the bearing of the selected object is to be observed and registered. If time presses, 16, or even 8 points, will suffice; but in the latter case, it is advisable to obtain the cardinal and intermediate points.

3. The real or correct magnetic bearing of the selected object from the ship must then be determined. By the term "real or correct magnetic bearing" is meant, that which the compass would have given on every point, had it not been disturbed by the local attraction of the ship. This may be generally effected by taking a mean of all the bearings: but a surer result will be obtained by carrying the *Standard* compass to the adjacent shore, in a position in a direct line between the ship (that part where the compass stood) and the distant object; the bearing of the latter will evidently be the same as its correct magnetic bearing from the ship.

Care however must be taken that the compass is not placed on *trap* (volcanic and igneous) rocks, or exposed to the influence of masses of iron, such as buried anchors, gas-pipes, or any collection of iron articles in adjoining storehouses.

The *correct* magnetic bearing of the distant object may also be determined by obtaining from the ship its astronomical bearing, and applying the variation to it,—that element being deduced from a variation chart, or else determined on shore in the neighbourhood of the ship's position.

4. The difference between the correct magnetic bearing of the distant object, and the successive bearings of it which were observed with the *Standard* compass on board, when the ship's head was

on each of the several points, will show the error at each of those points which was caused by the ship's iron; or, in other words, the *deviation* of the Standard compass.

5. The deviation thus found is named *East* when the N. end of the needle is drawn to the E., or *right* hand, and *West* when it is drawn to the W., or *left* hand of the magnetic meridian. As every seaman is familiar with the terms *East* and *West Variation*, it appears only necessary to point out that the terms *East* and *West* deviations are precisely analagous, and may be thus illustrated. A ship is off the Lizard, where the variation is 24° W.; with her head W.S.W., she has a *West deviation* of 6° ; and with her head E.N.E., an *East deviation* of 7° ; in the former case, with her head W.S.W., the variation and deviation being of the *same* name, may be treated as an actual variation on board of 30° W.; and in the latter case, with her head E.N.E., the variation and deviation being of *different* names, may be treated as a variation of only 17° W. Were seamen to consider the similarity of the terms deviation and variation, and the simplicity in using them combined, when convenient to do so, much of the misapprehension and mistakes which frequently occur in practice would be obviated.

To ascertain deviations by reciprocal bearings. 1. A careful observer must go on shore with a second compass, and place it on its stand or tripod in some open spot, under the conditions of being free from local influences as before noticed, and where it may be distinctly seen from the compass on board.

2. By means of *preconcerted* signals, the mutual bearings of the shore and ship's Standard compass from each other are to be observed at the moment the ship's head is steadily on each of the successive points of the compass. The observations should be *simultaneously* made as strictly as possible; and to guard against signals being misinterpreted, the time at which each bearing is taken should be noted, both on shore and on board, by compared watches.

3. Before, if convenient, or after the process is completed, the Standard compass should be carried on shore, in order to be compared with the compass which had been employed there, by means of the bearing of some distant object; and the difference (if any) is to be recorded, in order to correct or reduce the shore bearings to what they would have been had the ship's Standard compass been so employed. And in all cases when compasses are compared, the caps, pivots, &c., should first be carefully examined.

The following forms will be found convenient for registering the two processes of ascertaining the deviations:—

FORM 1.—BY BEARING OF A DISTANT OBJECT.

Observations to determine the effect of Ship's Iron on the Standard Compass of Ship "Perseverance," in the River Thames, 1st June, 1863. The correct Magnetic Bearing of a Church Steeple from the Ship, being N. 50° E. 8 miles distant.

Ship's Head by the Standard Compass.	Bearing of Steeple by the Standard Compass.	Deviation of the Standard Compass.	Ship's Head by the Standard Compass.	Bearing of Steeple by the Standard Compass.	Deviation of the Standard Compass.
North.	N. $45^{\circ} 10'$ E.	$4^{\circ} 50'$ E.	South.	N. $55^{\circ} 10'$ E.	$5^{\circ} 10'$ W.
N. by E.	$42^{\circ} 25'$	$7^{\circ} 35'$ "	S. by W.	$58^{\circ} 0'$	$8^{\circ} 0'$ "
N.N.E.	$40^{\circ} 25'$	$9^{\circ} 35'$ "	S.S.W.	$60^{\circ} 40'$	$10^{\circ} 40'$ "
N.E. by N.	$39^{\circ} 30'$	$10^{\circ} 30'$ "	S.W. by S.	$62^{\circ} 20'$	$12^{\circ} 20'$ "
N.E.	$38^{\circ} 50'$	$11^{\circ} 10'$ "	S.W.	$63^{\circ} 15'$	$13^{\circ} 15'$ "
N.E. by E.	$38^{\circ} 20'$	$11^{\circ} 40'$ "	S.W. by W.	$64^{\circ} 40'$	$14^{\circ} 40'$ "
E.N.E.	$36^{\circ} 45'$	$13^{\circ} 15'$ "	W.S.W.	$64^{\circ} 35'$	$14^{\circ} 35'$ "
E. by N.	$35^{\circ} 50'$	$14^{\circ} 10'$ "	W. by S.	$63^{\circ} 45'$	$13^{\circ} 45'$ "
East.	$35^{\circ} 30'$	$14^{\circ} 30'$ "	West.	$63^{\circ} 15'$	$13^{\circ} 15'$ "
E. by S.	$37^{\circ} 45'$	$12^{\circ} 15'$ "	W. by N.	$60^{\circ} 30'$	$10^{\circ} 30'$ "
E.S.E.	$40^{\circ} 0'$	$10^{\circ} 0'$ "	W.N.W.	$59^{\circ} 55'$	$9^{\circ} 55'$ "
S.E. by E.	$41^{\circ} 25'$	$8^{\circ} 35'$ "	N.W. by W.	$58^{\circ} 0'$	$8^{\circ} 0'$ "
S.E.	$44^{\circ} 40'$	$5^{\circ} 20'$ "	N.W.	$56^{\circ} 20'$	$6^{\circ} 20'$ "
S.E. by S.	$47^{\circ} 25'$	$2^{\circ} 35'$ "	N.W. by N.	$55^{\circ} 10'$	$5^{\circ} 10'$ "
S.S.E.	$50^{\circ} 15'$	$0^{\circ} 15'$ W.	N.N.W.	$52^{\circ} 40'$	$2^{\circ} 40'$ "
S. by E.	$54^{\circ} 50'$	$4^{\circ} 50'$ "	N. by W.	$49^{\circ} 20'$	$0^{\circ} 40'$ E.

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FORM 2.—BY RECIPROCAL BEARINGS.

Observations to determine the effects of Ship's Iron on the Standard Compass of Ship "Perseverance," made at Greenhithe, River Thames, 1st June, 1863.

[*Note.*—The Standard, and an azimuth compass were taken on shore, and compared by observing the bearing of a distant object with each compass, the two compasses being twelve feet apart, in order to prevent their having influence on each other. The bearings, by the means of several repetitions, were found to agree. The azimuth compass was retained on shore, and the Standard compass replaced on board.]

Time.	Ship's Head by the Standard Compass.	Bearing of the Shore Compass from the Standard Compass.	Bearing of the Standard Compass from the Compass on Shore.	Deviation of the Standard Compass.
A. M.				
9 20	E.S.E.	N. 76 0 W.	S. 66 0 E.	10 0 E.
9 24	S.E. by E.	75 10	66 35	8 35 "
9 30	S.E.	78 0	67 40	5 20 "
9 40	S.E. by S.	71 10	68 35	2 35 "
9 45	S.S.E.	69 0	69 15	0 15 W.
9 48	S. by E.	64 50	69 40	4 50 "
9 51	South.	64 30	69 40	5 10 "
9 55	S. by W.	61 50	69 50	8 0 "
10 0	S.S.W.	58 20	69 0	10 40 "

* And in like manner at all the points of the Compass.

It has been already stated that the terms *East and West deviation* are precisely analogous to that of *East and West variation*, and therefore, in applying the correction for the deviation to any course or bearing, the seaman must adopt the same method exactly as in the case of applying the variation; that is to say, he is to suppose his eye in the centre of the card, from whence, looking along the point in question, he is to apply the East deviation to the *right* hand, and the West deviation to the *left* hand.

Example 1.—If ship's head by Standard compass be E.N.E., and deviation (see Table) be $13^{\circ} 15'$ E., then the correct magnetic direction of her head will be $13^{\circ} 15'$ to the *right* hand of E.N.E., or about E. $\frac{1}{4}$ N.

Example 2.—If with the ship's head on the same point as in the foregoing example, the bearings of two islands be S.E. and W. by S. by the Standard compass, then by applying the same correction, $13^{\circ} 15'$ E., and in the same way, the correct magnetic bearing of those two islands will be S. $31^{\circ} 45'$ E., and N. $88^{\circ} 0'$ W., or, roughly, S.S.E. $\frac{1}{4}$ E., and W. $\frac{1}{4}$ N.

[This example is instructive as to the *necessity* of stating the direction of the ship's head when bearings are inserted in the log book uncorrected.]

Example 3.—If it be required to steer the vessel on a certain correct magnetic course, and for that purpose to determine what will be the corresponding course by the Standard compass, the above rule must be *reversed*.

Let the proposed correct magnetic course be S.E. The deviation for that point by the Standard compass is $5^{\circ} 20'$ E., which now being applied reversely, or to the *left* of S.E., gives S. $50^{\circ} 20'$ E., or S.E. $\frac{1}{4}$ E. for the *approximate* course to be steered; but to determine the course accurately, the deviation due to this partly corrected course must be employed, instead of that belonging to the proposed course. Referring to the Table, with the approximate course S.E. $\frac{1}{4}$ E., and taking the proportional difference from the half-point, the proper deviation to be allowed will be $7^{\circ} 0'$, which, applied to the left of S.E., gives S. 52° E., or nearly S.E. $\frac{1}{2}$ E. for the desired course.

[In vessels with a large amount of deviation, where a change of from 3 to 5° between consecutive points is not uncommon, it is necessary to pay due attention to the foregoing example.]

To prevent, however, any mistake in shaping a proper course by the Standard compass, it will be found useful to prepare a Table like the following, where the corrections for deviation have been applied *reversely*, as stated in Example 3, and with the corrections due to the approximate courses; in other words, the proper courses to be steered.

TABLE OF STANDARD COMPASS COURSES,

For Ship "Perseverance," determined in River Thames, England.

Correct Magnetic course proposed to be made.	Course therefore to be steered by Standard Compass in order to make good the proposed correct magnetic course.	Correct Magnetic course proposed to be made.	Course therefore to be steered by Standard Compass in order to make good the proposed correct magnetic course.
North.	N. 3 20 W., or nearly N. $\frac{1}{2}$ W.	South.	S. 6 50 W., or nearly S. $\frac{1}{2}$ W.
N. by E.	5 0 E. " N. $\frac{1}{2}$ E.	S. by W.	21 85 " S. by W. $\frac{1}{2}$ W.
N.N.E.	14 30 " N. by E. $\frac{1}{2}$ E.	S.S.W.	34 55 " S.W. $\frac{1}{2}$ S.
N.E. by N.	24 5 " N.N.E. $\frac{1}{2}$ E.	S.W. by S.	47 20 " S.W. $\frac{1}{2}$ W.
N.E.	34 20 " N.E. by N.	S.W.	59 40 " S.W. by W. $\frac{1}{2}$ W.
N.E. by E.	46 5 " N.E.	S.W. by W.	70 35 " W. by S. $\frac{1}{2}$ S.
E.N.E.	55 50 " N.E. by E.	W.S.W.	81 0 " W. $\frac{1}{2}$ S.
E. by N.	65 50 " N.E. by E. $\frac{1}{2}$ E.	W. by S.	N. 88 25 " W. $\frac{1}{2}$ N.
East.	76 10 " E. by N. $\frac{1}{2}$ N.	West.	79 10 " W. by N.
E. by S.	86 55 " E. $\frac{1}{2}$ N.	W. by N.	68 45 " W. by N. $\frac{1}{2}$ N.
E.S.E.	S. 80 5 " E. $\frac{1}{2}$ S.	W.N.W.	59 0 " N.W. by W. $\frac{1}{2}$ W.
S.E. by E.	66 5 " S.E. by E. $\frac{1}{2}$ E.	N.W. by W.	49 10 " N.W. $\frac{1}{2}$ W.
S.E.	52 20 " S.E. $\frac{1}{2}$ E.	N.W.	39 15 " N.W. $\frac{1}{2}$ N.
S.E. by S.	36 55 " S.E. $\frac{1}{2}$ S.	N.W. by N.	29 45 " N.N.W. $\frac{1}{2}$ W.
S.S.E.	22 45 " S.S.E.	N.N.W.	20 30 " N. by W. $\frac{1}{2}$ W.
S. by E.	6 15 " S. $\frac{1}{2}$ E.	N. by W.	11 45 " N. by W.

This Table should be hung in a convenient and public place, in order that the pilot or officer of the watch may make immediate use of it; but it must be remembered that whenever, by shifting guns or cargo, or by great change of latitude, the deviation of the standard compass is found to vary, a new Table should be immediately constructed. This may be effected at sea by a series of azimuths taken with the ship's head successively on different points, and comparing the variations so determined with the known variation at the place of observation. In any cursory examination, the points of most importance to determine will be those of no deviation, of greatest deviation, and at a few of the intermediate points.

In an iron ship especially, it is always desirable to determine the compass variation by actual observation of the sun's *azimuth* and *amplitude* frequently during the day, whilst at sea; for it must be remembered, that by these means the two corrections, viz., for deviation and variation combined, are obtained, and ample warning afforded for any necessity of the reconstruction of the Deviation Table. (*See Practical Hints about Compasses, page 328.*)

It now only remains to add, that the mariner must remember that the corrections found for the Standard compass belong to that compass alone—and to that compass only while in its proper place; and that those corrections will furnish no guide whatever to the effect of the ship's iron on a compass placed in any other part of the ship.

It is essential, therefore, that the ship's course should not only be invariably directed by the Standard compass, but that all the courses and bearings inserted in the log-book should be those shown by that compass alone; the binnacle compass or compasses being regarded solely as a guide to the helmsman: thus, when a ship has been placed on her proper course by Standard compass, the helmsman will notice the point shown by the binnacle compass as being that to which *he* has to attend; and a comparison of the two compasses should be frequently made by the officer of the watch, especially whenever any alteration occurs in the direction of the course.

Graphic Methods. The deviations of the Standard compass are admirably illustrated by graphic methods for their determination and application, published by order of the Lords of the Admiralty, and also by the Board of Trade. Mr. A. Smith's straight-line method will be found a simple and convenient plan for tabulating the results of the observations, and of making the "course" corrections.

We recommend to seamen the adoption of these ingenious aids to the practice of navigation; they are obtainable of J. D. Potter, Admiralty Chart Agent.

THE TIDES OF THE INDIAN OCEAN.

The rise and fall of the tide twice a day, or nearly so, is quite familiar to every one, and it will be taken for granted that this is due to the attractions of the sun and moon; for, although the planets exercise a certain amount of attraction, still their distances are so enormous that the effect thereof in the tides is quite inappreciable.

Now the moon (supposed to be on one side of the earth) tends to draw up the water nearest to it, and produces high water. Every part of the earth feels the moon's influence, but not all equally; those parts nearest to it necessarily feel it the most, and those furthest feel it the least. so that the water nearest to the moon is heaped up most; but at the same time that the moon is effecting this, it tends to draw the earth away from the water on the opposite side, so that there would be a rise of the water there relatively to the earth's surface. We see, then, that at any moment there are two high waters from the attractive forces, and, of course, there will be two low waters at the intermediate points of the surface between them. The sun again influences the water in the same way.

Now the moon makes her apparent circuit in 24 hours and 48 minutes: therefore the moon's wave will recur twice in that period, or at every 12 hours and 24 minutes; thus we see there is a semi-diurnal lunar tide, and also another solar tide. It is evident that if these two waves follow the same direction nearly (as indeed they do), on the surface of the earth, they must produce the effect of one wave recurring nearly at the periods of the greater of the two, but modified in its height by the smaller wave. Thus, when the summits of the two happen to coincide, the summit of the combined wave will be at its highest. When the hollow of the smaller wave coincides with the summit of the larger, the summit of the combined wave will be at its lowest.

Now, as the sun's wave recurs every 12 hours, and the moon's wave every 12 hours 24 minutes, the sun makes thirty waves in about the same time that the moon makes 20 waves; and if at the first of these 20, the summits of the two coincide, at the 15th the summit of the moon's will coincide with the hollow of the sun's, and at the 20th the summits of the two will again nearly coincide. The height of the first and last will be the sum of the two, and that of the middle one will be the difference. These are in fact the *spring tides*, or great tides which occur every fortnight, at or soon after new and full moon; and the neaps or small tides occur in the intermediate weeks. The amount of the lunar tide is more than double that of the solar tide.

Diurnal inequality. At spring tides the effects of sun and moon are the same throughout the year. At neaps, in summer and winter, the moon makes the circuit of the Equator, and in spring and autumn that of the tropical zones. At new and full moon, during summer and winter, the sun and moon exert their attractive forces together upon alternate belts of the earth's surface, so that the consecutive waves (caused by these attractions) although recurring at the regular times, or nearly so, will be in themselves different. In spring and autumn, the attractions are exerted upon the Equator each time, consequently the consecutive waves will be nearly similar.

At the quarters of the moon, when the sun and moon are at right angles to one another, in spring and autumn the moon will be on the tropics and the sun on the Equator; and in summer and winter the moon will be in the Equator and the sun in the tropics. The effect of these varying causes is that, in summer and winter, alternate spring tides are high and low, and neap tides are nearly regular. In spring and autumn, the spring tides are regular, and neap tides alternately vary. Thus we see that there are diurnal and semi-diurnal tides, both lunar and solar, which are called the **short period tides**, and the difference in the alternate superior and inferior high waters produced by them represents what is called the diurnal inequality.

Long period tides. Besides the above tides, we must consider that the moon, according as she is in the Equator, or further and further from it in either N. or S. declination, will cause a fortnightly tide, consisting of rise at the Equator and fall at the poles, on the average of 24 hours when the moon is crossing the Equator, and fall at the Equator and rise at the poles when the moon is in greatest N. or S. declination. And for a similar reason there will be a semi annual tide for solar declination. We shall thus understand also that the tide wave, whose summit is in the Equator, is greater than one whose summit is on one or the other side of the Equator—that the height of the tide depends in fact upon the *declination* of the sun and moon; being greatest when the declination is zero, and least when the declination (whether N. or S.) is greatest. Now Equinoctial tides are well known to be the highest. At the Equinoxes, the sun and moon act in concert upon the Equator, when they have the greatest effect.

Again:—according as the moon is in apogee or perigee, there will be a lesser or a greater

heaping up of water round the Equator and a sinking at the poles, and this is the cause of a monthly lunar tide. And for similar reasons there is an annual solar tide.

Summary. The above is a brief explanation of the principal inequalities in the tide-generating forces; the other minor ones, depending on the moon's perturbations, need not be taken into consideration in our brief account of the tides. But the intelligent mariner must remember the *four following* chief tidal constituents (as explained above) that are found in most localities:—

Firstly.—Lunar and solar semi-diurnal tides.

Secondly.—Lunar and solar diurnal tides.

Thirdly.—Lunar fortnightly and solar semi-annual tides.

Fourthly.—Lunar monthly and solar annual tides.

In the Gulf of Cambay there is a diurnal inequality of 7 or 8 feet in the height, but the two tides arrive at their regular intervals: there is no inequality of time. But at many localities, there is more or less diurnal inequality, both in height and time, and a want of due attention to this fact has doubtless introduced confusion into the records of local observations. It so happens that the diurnal inequality here (on the coasts of England) is so small, that it is considered a comparatively unimportant matter. Taking their knowledge from British tides, our navigators in distant seas are often unprepared for the above phenomenon. Thus observed facts, which are really of great importance, have sometimes been set down as merely accidental irregularities due to local causes. It is well known that the night high tide is higher than the day high tide, both at Calcutta and Bombay, in the winter season or N.E. monsoon, when the sun is in Capricorn. But in the S.W. monsoon, with the sun in Cancer, the day high water is higher than that of the night. This phenomenon also occurs in the Gulf of Cutch.

The Admiralty publish Tide Tables for many British Ports, and it is to be hoped that such tables may eventually be drawn up for the Ports of British India. Then the mariner would benefit by the predicted height of the tide for any day—the exact height due to the attraction of sun and moon, but still liable to differ on any day owing to **two causes** which are not calculable beforehand; firstly, the weight of the atmosphere as indicated by the barometer; and secondly, the effect of the wind, which when from one direction may *raise*, and in others may *lower* the tide, affecting both time and height.

The Tide-Wave. After the graphic method, adopted by Dr. Whewell in his "First approximation towards drawing a map of *Co-tidal Lines*," we have given a chart of the Indian Ocean, showing roughly the *Co-tidal Lines*, or the progress of the Wave of High Water in hours of Greenwich time. Mr. William Parkes, the eminent harbour engineer—who has deeply studied the tides of Karachi, Bombay, and Calcutta, and to whose writings concerning "the Tides" we are indebted for much of the above brief explanations—does not think this mode of illustration the most correct, but we adopt it as the most graphic to engage the attention and interest of seamen. Mr. Parkes publishes Annual "Tide Tables" for Bombay and Karachi, by authority of the Secretary of State in Council of India. From these we take a Table and *two examples* (in the next pages) to show their utility and what benefit we should derive from similar "Tide-Tables" for Calcutta and other great Indian ports.

The Age of the Tide. Dr. Whewell's collated observations showed that a greater number of high waters occurred between 6 and 7 hours after the passage of the moon. It will be seen that the lines at the Chagos and Seychelle groups, and at Mauritius, differ little from this. But in its progress the Tide-wave suffers great retardations and impediments which cause variations to the amount of several hours. If they extend to 12 hours, it becomes a question whether the tide which we see is due to one transit of the moon or another. It may be either a very quick, comparatively unimpeded tide, formed by a late passage, or a much retarded tide formed by an earlier one. If we can trace the impediments, we can at once decide; but if not, we must compare the heights of several successive tides with the changing relative positions of the heavenly bodies. We know what variations in the tides the changes in the positions of the heavenly bodies will cause, and we must see *how long after* such changes of position the variations in the tides actually occur. This interval is called the **age of the tide**, and it simply represents the time that has elapsed since the sun and moon were in the position to form it, and includes both the time occupied in forming and the time during which it has since been rolling about upon the sea. Thus the tide on the West coast of Ireland is two days old, whilst that on the East coast of England is two and a-half days old, and the highest spring tides occur respectively two days and two and a-half days after the new and full moon.

Tidal Currents. The tide-wave in the deep sea is merely an undulation; but, when shallow seas or bays are reached, the movement of the water is discernible. The general principle is, that in the deep sea there is a quick movement of the wave, and a slow movement of the water; in the shallow sea there is a slow movement of the wave, and a quick movement of the water, which is

called the tidal current. These currents are frequently spoken of as the *flood* and *ebb* tides; but the terms (although sanctioned by usage) are not correct, because *flood* and *ebb* are applied to the rising and falling of the water, which is quite a different thing. The flood current in a channel supplies water for the wave, but the wave requires water after its summit has passed any particular point, so that at that point *flood current* continues, although *ebb tide* may have commenced. Similarly *ebb current* may continue, after *flood tide* has commenced. In the Gulf of Cambay the ebb current frequently runs for an hour and a half after actual low water; and in the Persian Gulf, the tidal current has been observed to run on for nearly three hours at some places after the water has begun to rise or fall.

Tidal currents have also much to do with the formation of *bars* at the mouths of Indian rivers. Therefore, unless the harbour engineer has a full knowledge of their set and force, and whether they act in conjunction with or in opposition to the ocean currents, his plans for improvement may be rendered nugatory.

The Tide-Wave of the Indian Ocean. Of course it is mere hypothesis that a great wave passes (as on the chart) to the Westward, round the S.W. extremity of Australia into the Indian Ocean. Yet certain anomalies in the tides at King George's Sound—where there sometimes appears to be only one tide in the day—seem to indicate a second wave as coming some hours after a first wave, and thus adding to the first high water and producing a prolonged tide. The second wave (if we may so call it for distinction) must be also hypothetical, but it might be confirmed by accurate observations at the Keelings Islands and at the Chagos group, in conjunction with others at Sunda Strait, at the E. end of Java, and along the N.W. coast of Australia.

The tides of the Asiatic Archipelago have yet to be investigated, but our conviction is (as the chart represents) that the wave down Malacca Strait, and that which flows to Eastward between Java and Australia (till it meets the Pacific wave which has come through Torres Strait) are a backward undulation from the wave which the moon has formed under herself as she passes over the deep sea near the Keelings Islands, where high water occurs about two hours sooner than at Sunda Strait, or about four hours after the passage of the moon; whereas at Torres Strait the high water is about 9 hours after the moon. We assume that the moon does thus *pick up*, as it were, a fresh wave; and, as the tide follows the moon, the first effect close to the W. shore of Australia and the S. coast of Java, must be to draw the water away from the land, in order to form a tide-wave to the W. of that land. A certain space of water behind the moon is required to form a wave; this wave then, when brought to a head, as it were, may be easily supposed to fall back upon the coast of W. Australia, causing high water at Swan River at a later hour than at the N.W. Cape, and later still at King George's Sound, where (we are told) the flood current comes in from the Westward, and the diurnal inequality of the times is very great, so that sometimes the two tides come close together, and the water falls so little between them, as if there were only one tide in the day.

In the Gulf of Carpentaria, Flinders found great inequalities, and was induced to believe that there was only one tide in the day *there* also. This might be due to the great inequality of time bringing the two tides together, or to the great inequality of height causing the smaller tide to be overlooked, but recorded facts are too few to determine by. We must leave to the rising generation of scientific mariners the task of elucidating the progress of the tide-wave in those Eastern seas, and of showing to their fellow seamen how the tidal currents are interfered with by the periodical ocean currents and prevailing winds. Mr. Parkes has given a sketch of the tides in the seas between the Pacific and Indian Oceans, and thus remarks. "High water occurs at every hour of the twelve, at some part or other. The two tides of the day differ from one another in all or almost all parts; but in some cases the difference is in the height of high water, in some in the level of low water; in some in the time at which the summit of the wave arrives; in others, in the time at which the hollow of the wave passes; but each passes through its regular series of changes from fortnight to fortnight, from year to year, and from era to era; each change following the influence of the different positions of the heavenly bodies. The *diurnal inequality* (so marked a feature in these tides, arises from the fact that the two waves, formed in different parts of the ocean, travel by routes differing in length, direction and conformation. The meetings or the crossings of two waves may present great modifications. Where the summit of one comes near the summit of another, we shall have a wave of double height. Where the summit of one coincides with the hollow of another, we shall have both obliterated."

A method of finding the height of tide* at any hour, for the principal ports which have "Tide Tables" prepared for them—such as Bombay and Karachi,—is given in the next page.

* To Mr. W. Parkes, C.E., we are indebted for this table and examples. Much of the foregoing information has been gleaned from Mr. Parkes' little book on "The Tides," and from Colonel Walker's "Notes on the harmonic analysis of Tidal Observations."

TABLE

For finding the Height of the Tide at any intermediate period of flood or ebb,—the amount of rise and the times of low and high water being known.

Total Rise from Low to High Water.	Tide above Low Water level.					
	One-sixth Flood.	One-third Flood.	Half-flood.	Two-thirds Flood.	Five-sixths Flood.	High Water.
Feet.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
4	0 3½	1 0	2 0	3 0	3 8½	4 0
5	0 5	1 2½	2 6	3 8½	4 7	5 0
6	0 6	1 6	3 0	4 6	5 6	6 0
7	0 7	1 9½	3 6	5 3½	6 5	7 0
8	0 8½	2 0	4 0	6 0	7 3½	8 0
9	0 9	2 3½	4 6	6 8½	8 2½	9 0
10	0 9½	2 7	5 0	7 5	9 2½	10 0
11	0 11	2 9½	5 6	8 2½	10 1	11 0
12	1 0	3 1	6 0	8 11	11 0	12 0
13	1 0	3 3½	6 6	9 8½	12 0	13 0
14	1 1½	3 7	7 0	10 5	12 11	14 0
15	1 2½	3 9½	7 6	11 2½	13 9½	15 0
16	1 3	4 1	8 0	11 11	14 8½	16 0
17	1 3½	4 3½	8 6	12 8½	15 8½	17 0
18	1 5	4 7	9 0	13 5	16 7	18 0
19	1 6	4 9½	9 6	14 2½	17 6	19 0
20	1 7	5 1	10 0	14 11	18 5	20 0

For the corresponding periods of ebb tide use the same figures, but consider them as the amounts of *fall* from *High Water* level.

EXAMPLE I.—To find the height of the water at Bombay at 5 P.M. on Sept. 13th, 1873.

Previous High Water . . . 3h. 14m. (from Tide Table) 2ft. 8in. Height above Zero.

Next Low Water . . . 10h. 2m. " " 4ft. 11in. Depth below Zero.

Duration of ebb . . . 6h. 48m. 7ft. 7in. Fall of Tide.

One-sixth of duration of ebb is 6h. 48m. ÷ 6 = 1h. 8m. Therefore one-sixth ebb occurs at 3h. 14m. + 1h. 8m. = 4h. 22m., and one-third ebb at 3h. 14m. + 2h. 16m. = 5h. 30m.

Fall (from Table) at one-sixth ebb for tide of 7ft. 7in. = 0ft. 8in.

one-third ebb " " = 1ft. 11in.

Whence height of water at 4h. 22m. is 2ft. 8in. — 0ft. 8in. = 2ft. 0in.

" " " 5h. 30m. is 2ft. 8in. — 1ft. 11in. = 0ft. 9in.

or, (according to proportion), at 5h. 0m. the height of the water is about 1ft. 5in. *above* Zero.

EXAMPLE II.—To find the height of the water at Bombay at 4 A.M. on Sept. 16th, 1873.

Previous Low Water . . . 0h. 28m. (from Tide Table) 3ft. 5in. Depth below Zero.

Next High Water . . . 8h. 0m. " " 2ft. 11in. Height above Zero.

Duration of flood . . . 7h. 32m. 6ft. 4in. Rise of Tide.

Therefore, one-sixth flood = 1h. 15m.; one-third flood = 2h. 3m.; one-half flood = 3h. 46m.

Previous L. W. + one-sixth flood = 0h. 28m. + 1h. 15m. = 1h. 43m.

" L. W. + one-third " = 0h. 28m. + 2h. 31m. = 2h. 59m.

" L. W. + one-half " = 0h. 28m. + 3h. 46m. = 4h. 14m.

Rise at half flood (from Table) for tide of 6ft. 4in. = 3ft. 2in.

Proportional rise in 14m. (from Table; one-fifth of diff. between 1ft. 6in. and 3ft. 2in.) = 0ft. 4in.

Rise up to 4 A.M. 2ft. 10in.

Therefore, 2h. 10m. deducted from 3ft. 5in. leaves 0ft. 7in. *below* Zero, as required height of water.



SECTION I.

ENGLAND TO MALTA, SUEZ AND ADEN.

CHAPTER I.

ENGLAND TO GIBRALTAR.

FERROL—CORUNNA—CAPE FINISTERRE—AROSA BAY—VIGO—TAGUS—LAGOS BAY—CAPE ST. MARY—
CADIZ—CAPE TRAFALGAR—TARIFA—GIBRALTAR BAY—AFRICAN COAST—TANGIER—CEUTA—
WINDS, TIDES, CURRENTS, RACES, IN GIBRALTAR STRAIT—PASSAGES—WINDS AND CURRENTS.

(VARIATION OF COMPASS AT FALMOUTH, 23° W.; AT GIBRALTAR, 19° W.)

In accordance with the plan laid down, a description of the land and ports likely to be approached, either in outward or homeward-bound vessels, will be given, and then general directions for making the passage, to ensure the safety of the ship and a quick voyage.

So exceptional is the necessity for approaching the coast or making any harbour in the Bay of Biscay, that we need only describe one or two ports which, in case of not weathering Cape Finisterre, it may be necessary to bear up for. Further information will be found in the Section, from England to Cape of Good Hope (pp 33 to 37).

FERROL HARBOUR. The bay formed by Cape Priorino and Hermino Point may be called the entrance to the three inlets of Ferrol, Betanzos and Corunna: the distance between the two points being 5 m. Ferrol, the northern inlet, is the best, as it is enclosed by high land, and shelters from all winds; the entrance between Priorino Light and Coitelada Point is nearly 1½ m. broad; but, as you go in, it narrows to a channel, which, in some parts, is not more than 2 cables wide, though it is 1½ m. in length; having passed this channel the harbour is spacious.

There is no danger in making Ferrol. Either point of the entrance can be rounded at 3 cables. La Muela Rock, which lies off Segano Point, is now marked by a Red buoy. Having passed this, a mid-channel course must be kept until within the harbour, when you must haul to the N.E. for anchorage.

Light. The N. point of entrance, Priorino Chico, has a light, *fixed*, White, giving a Red flash every two minutes; visible 12 m.; elevated 90 ft. Lat. 43° 28' N., lon. 8° 20' W.

Cape Prior, 6 m. to N.N.E. of Chico Priorino, has a bright *fixed* light, 450 ft. high.

CORUNNA BAY. The southern inlet is not so clear of danger as Ferrol. A rocky bank, *Jacentes*, a mile in extent, lies immediately before the port, 1½ m. to N.E. of the light; in fine weather it may be crossed, but it breaks heavily in bad weather, and must be avoided. As the shore is bold on both sides, and can be approached to 3 or 4 cables, you should keep either shore abroad until within this bank, when the Bay may be said to be entered; this entrance, between Herminio Point and Mera Point, is 1½ m. wide

Lights. If coming from the W., the light-house of the Torre de Hercules, 330 ft. above the sea, is conspicuous, and will lead up to the Bay. Hercules Light is *fixed*, White, flashing every three minutes; visible 16 m. After rounding Herminio Point, which is ¾ m. E.S.E. of the light, steer about S.E. by S. until San Diego Castle opens to E. of San Antonio Castle; being then clear of the Cabanes rocky shoal, which breaks when there is much sea, steer for the light on San Antonio Castle, and, having rounded it at a cable distance, you may anchor. Vessels above 50 tons are bound to employ a pilot.

Between **Corunna** and **Finisterre** there are two lights. **Sisargas Light** is *fixed*, White; but flashes Red every four minutes, lat. $43^{\circ} 22' N.$, lon. $8^{\circ} 50' W.$ **Cape Villano Light** is *fixed*; visible 10 m.; lat. $43^{\circ} 10' N.$, lon. $9^{\circ} 13' W.$ **African Rock** lies half a league off Cape Torinana, 8 m. W.S.W. from Villano, and 12 m. to N. of Finisterre. (See also p. 34.)

CAPE FINISTERRE. The land to the N. of this cape, is high, with a flat top. The Cape itself is not high, but easily recognised by the light-house, nearly 470 ft. above the sea.

Finisterre Light is *revolving* every 30 seconds; visible 20 m.; lat. $42^{\circ} 53' N.$, lon. $9^{\circ} 15' W.$

The coast from Cape Finisterre to Cape Silleiro, 50 m., is broken by a series of deep inlets, the headlands between which are rugged. As many dangers lie off the shore, it should not be approached at night or in thick weather.

Arosa Bay is an extensive inlet with good shelter, and may be resorted to in case of emergency with a leading wind and by daylight. The entrance is 2 m. wide. The W. side of it, **Salvora Island**, is distinguished by a light-house. A mid-channel course, after rounding **Brisan Point**, leads safely in, when the **Rua Light-house** will be seen. Passing between the **Rua Light-house**, and that on the N.W. end of **Arosa Island**, you can haul to the W. into **Puebla Bay**.

Ons Island, 5 m. to the S. of Arosa Bay, affords safe anchorage on its E. side in W. winds, at 3 cables from the shore. A light-house is on the summit of the island, which is 400 ft. high. In rounding **Ons Island**, give a berth to the rocks off the S. end.

VIGO BAY, a deep and safe inlet, is fronted by the **Cies** or **Bayona** islands. The middle island, **Faro**, has a *revolving* light, 595 ft. high. Under the lee of the islands, there is safe anchorage in 9 or 10 fathoms in W. gales. **Vigo Bay** can be entered either to the N. or S. of those islands, according to the wind. Entering by the N. channel, care must be taken to avoid a reef of rocks, which extend $1\frac{1}{2}$ m. N. from **Caballo Point**; by keeping **Cape Hombre** in a line with the hill of **N^a. Senora del Alba** about S.S.E. $\frac{1}{2}$ E., until **Monte Ferro** bears S. $\frac{1}{2}$ W. Then steer for the latter until the centre of the Bay opens.

By the S. passage, **Cape Mar** in line with the light-house of **Monte de la Guia**, bearing E. by N., will lead in mid-channel between the dangers off **St. Martin Island** and those off the main. When **Faro Light-house** opens to the E. of **St. Martin**, haul to the N.E., towards the centre of the Bay. By keeping midway between the shores all dangers are avoided until the town of **Vigo** is past, then anchor in from 6 to 9 fathoms.

Between **Vigo** and **Lisbon** there is no port that a vessel might run for without a pilot.

Burlings and Farilhoes are a remarkable cluster of islets, between 300 and 400 ft. high, off **Cape Carvoeiro**. **Burlings Light** *revolves* every three minutes; 365 ft. above sea. The channel between them and the main is clear. In foggy weather keep well to the W.

TAGUS RIVER. The approach to the **Tagus**, from the N., is well marked by the **Cintra** mountains, 1,700 ft. high, and also by **Cape Roca** (Rock of **Lisbon**), a cliff about 550 ft. high, with a light-house on the summit. **Cape Razo** is 4 m. S. of **Roca**, and from thence the coast trends to S.E. $4\frac{1}{2}$ m. to **Guia Light**, then to the E. to **Cascaes Bay**; where, during summer months, when N. winds prevail, anchorage may be sought in 10 to 12 fathoms with **Fort St. Martha** in a line with **Guia Light-house**, N.W. $\frac{1}{2}$ W., and the town of **Cascaes** nearly open to N. of **Cascaes Fort**.

The entrance to the **Tagus**, between forts **St. Julian** and **Bugio**, is $1\frac{1}{2}$ m. wide. Off both forts there are dangerous sandy shoals extending to the W., and having between them a deep channel nearly a mile broad. These sand-banks are the N. and S. **Cachopo**. Between N. **Cachopo** and **Fort St. Julian** is the narrow North channel, which can only be taken with a fair wind.

Belem Castle, on the N. side of the **Tagus**, 5 m. above **Fort San Julian**, and about 2 m. below **Lisbon**, is prominent in entering the river; it stands on a projecting point, nearly insulated at high water; near it is the quarantine station. Here are the health and customs offices, and off it all vessels are boarded on entering. **Belem** is almost connected with **Lisbon**.

Cachopo Shoals. The N. shoal extends from **Fort St. Julian** about W. by S. $\frac{1}{2}$ S. $3\frac{1}{2}$ m., and has a shoal patch of 6 ft. The S. shoal extends from **Bugio Fort** W.S.W. $1\frac{1}{2}$ m.; this shoal has a like depth, and is marked by White buoys.

The Bar, between the outer extremes of the two shoals, has 6 and 7 fathoms over it at L. W. springs; the channel within soon deepens to 9 fathoms: between the two forts there is 19 fathoms. In S.W. gales the sea frequently breaks heavy on the Bar; in winter, when the freshes are strong, this break continues for days together, and at such times the Bar is impassable.

LIGHTS. **Cape Roca** has a *revolving* light, alternating Red and White every 100 seconds; elevated 600 ft.; visible 20 m.; lat. $38^{\circ} 46' N.$, lon. $9^{\circ} 30' W.$ **Guia Light** is *fixed*; 210 ft. high; visible 12 m. Lights are exhibited from **Forts Julian** (*fixed*) and **Bugio** (*revolving*). **Fort Bon Success**, near **Belem Castle**, has a small Red light.

The Tides of the Tagus are dangerous. Off Lisbon City, the ebb sometimes runs 6 or 7 knots, when freshes come down after rain. Flood is generally much weaker than ebb. The current sets directly through the S. channel and over the Bar; on flood 3 m., and on ebb 4 m. an hour. To enter during ebb you must have a strong breeze. H. W. at F. and C., on the Bar, at $2\frac{1}{2}$ h.; rise 16 ft.

Winds. Within the river the wind comes irregularly down the valleys on either side, excepting when it blows up or down river, when it is pretty steady.

Pilots are usually found off the entrance, or at Cascaes town. Their boats have a Blue flag at the yard-arm of their lateen sails.

DIRECTIONS.—The North Channel into the Tagus requires a knowledge of the tides, and in a sailing vessel a commanding breeze. Having passed Guia and Cascaes, bring Cassilhas Point (the E. termination of the S. shore) in line with the S. face of Fort San Julian bearing E. by S. $\frac{1}{2}$ S.,—or if wishing to borrow on the Cachopo, Belem Tower on with the S.E. extreme of San Julian Point;—steer in with either of the above marks until Guia Light-house is in one with the angle or centre of the high part of Santa Martha Fort, N.W. $\frac{1}{2}$ W.; then keep this latter mark on, and it will lead in mid-channel, in not less than 6 fathoms at low water.

When the centre of Mount Cordova (on the S. shore) comes in one with Bugio Tower, bearing about S.E. $\frac{1}{2}$ S., steer for Bugio until San Thomas Fort (which is white and a long half mile N.E. of San Julian) opens to E. of the yellow fort of Catelazete; then haul into the river, but carefully allowing for tides, as the flood sets right on the shoal extending from San Julian, while the ebb sets directly on the N. Cachopo.

Mount Cordova is 12 m. from San Julian Fort, and may not be visible; in this case, having entered the N channel, as soon as the rocks at Catelazete Point are open of the S.E. angle of Fort San Julian, steer for Bugio Fort till the battery at Catelazete Point, San Thomas Fort (the next to it), and the outer windmill, are in line bearing N.E. by E., and then haul more to E. into the river. With Rana Church in one with Quinta Nova, and Cassilhas Point in one with the S. face of Fort San Julian, a vessel will be in the centre of the fairway, and have Guia Light-house in one with the bastion of Santa Martha Fort.

The South Channel is the principal one into the river. Entering with a fair wind, and rounding the S. extreme of N. Cachopo, keep the Peninha (or W. part of the mountains of Cintra) bearing N. $\frac{1}{2}$ E., and open to W. of Cascaes Fort, until Bugio Fort comes in one with Estrélla Dome, E. $\frac{1}{2}$ N. Then steer towards Bugio, keeping it in one with Estrélla Dome, in which line the Bar connecting the N. and S. Cachopos will be crossed in the deepest water, not less than $6\frac{1}{2}$ fathoms; and when the Paps are in one with Jacob's Ladder, E. by N. $\frac{1}{2}$ N., a vessel will be inside the Bar, and in deeper water. Now run up with the Paps in one with Jacob's Ladder, or if the wind hangs to the N., borrow as far as the N. turning mark (Paps in one with Caxias, E. by N. $\frac{1}{2}$ N.) If the wind be from S.E., borrow towards the S. turning mark (Paps in line with the cypress tree,) bearing about E.N.E., but avoid going too near Bugio, as the tides there are strong and irregular, and the shoal steep-to.

Having passed between Bugio and San Julian, keep to the N., so as to clear the sandy flat inside Bugio, till Belem Castle is in line with the S. part of the city of Lisbon, bearing E. $\frac{1}{2}$ S. Pass Belem Castle at 2 or 3 cables off; and then proceed to the anchorage, keeping Fort San Julian and all its outworks open to the S. of the parapet of Belem Castle. This will clear the shoals of Alcantara, until the vessel arrives off the Packet Stairs, where there is anchorage in from 10 to 14 fathoms, or farther up in 12 to 16 fathoms mud.

Turning through the South Channel. A vessel standing S.E. towards the W. tail of N. Cachopo, should keep Peninha Peak bearing N. $\frac{1}{2}$ E., open to W. of Cascaes Fort, and in not less than 12 fathoms water, until the S. part of the city of Lisbon is in line with Bugio Fort, E. $\frac{1}{2}$ S.; then haul to the wind. The turning mark for the N. side of the channel is the Paps in line with the Mirante or Turret of Caxias E. by N. $\frac{1}{2}$ N.; and the turning mark for the S. side of the channel is the Paps in line with the cypress tree (which stands a third of a mile E. of Jacob's Ladder,) E.N.E.

The N. turning mark is safe and prudent, as a vessel will not approach any part of the N. Cachopo nearer than $\frac{1}{2}$ m. The S. turning mark carries a vessel within $1\frac{1}{2}$ cables of S. Cachopo, and as the tides here are uncertain, the shoal should be approached with caution.

Rana Church open W. of Quinta, bearing N. by E. $\frac{1}{2}$ E., clears the tail of the S. Cachopo, and a vessel working in, need not go to the E. of this line until well in the channel. A mill on a height $1\frac{1}{2}$ m. N.E. of Fort San Julian, open to E. of Fort San Thomas, bearing N.E. by E., clears the E. edge of the N. Cachopo, and is a good, near, fairway mark in running out through the S. channel. The shallow ground around San Julian extends a short distance from the fort, but deepens immediately to 5 and 6 fathoms; San Thomas Fort well open E. of the small battery of Catelazete, clears the S. extremity of this shoal.

Having passed Forts San Julian and Bugio, stand to either shore into 12 fathoms; a good mark for clearing the shoulder of the sands, inside of Bugio, is Belem Castle in one with the citadel of Lisbon, which stands on the first rise of the land from the S. point of the city. Between Medao Point and the village of Trafaria, the S. shore is bordered by a bank of the latter name, which extends off full a third of a mile, with deep water close to it. To clear this bank, the houses at Torre Velha must be to N. of Trafaria cliffs. Above Trafaria the S. shore of the river is clear, with deep water as far as Cassilhas Point.

Between Fort San Julian and Belem Castle the N. shore is bordered by a narrow bank, but W. of the castle it extends off a $\frac{1}{2}$ m. The shore on the S. side of the castle is steep; thence it is again bordered by a bank, which in places extends nearly 2 cables off, with 5 fathoms on its edge, and deep water close-to.

When nearing Alcantara bank, the mark (for clearing it in 7 fathoms,) is San Julian Castle and outworks open of the parapet of Belem Castle, until Alcantara, which appears like the angle of a fort with a watch-tower, bears N. $\frac{1}{2}$ W. The bank will then be passed, and the shore may be approached until the tower of San Julian is in one with the parapet of Belem Castle; and this is a good mark for anchoring in an in-shore berth in 7 or 8 fathoms water, off the Packet stairs. A ship of heavy draught will be far enough out in 12 or 14 fathoms, good holding ground of stiff mud, and out of the strength of the tides.

At night. If coming from the N., bring Guia Light to bear N., and run for it until Bugio Light bears E.; then steer for Bugio until San Julian Light bears N.E.; when an E.N.E. course will lead between the two lights. When Belem Light is seen, bring it to bear E. by S., as the vessel will be nearly in mid-channel, and then run up the river.

In entering from the S., bring San Julian Light to bear N.E., and run on that bearing until the Bugio Light bears E., then proceed as directed above. San Julian Light N.N.E. just clears the S. Cachopo in 4 fathoms.

When Cape Roca Light is shut in with Guia a vessel will be nearing the shoals, and within the influence of the river tides, and therefore a cautious and constant reference to the bearings will be necessary. Should the ebb tide be running, be careful not to be set too near Bugio, and if in any doubt, steer more to the N.

CAPE ESPICHEL TO CAPE ST. VINCENT. Cape Espichel Light-house is 625 feet above the sea. The coast from this cape to Ribiera river is generally low and sandy; onwards to Cape St. Vincent it gradually rises, with steep rocky cliffs. The Sierra de Monchique (its highest part, Foya, elevated 3,830 feet) is remarkable, 8 leagues E.N.E. of St. Vincent Cape.

CAPE ST. VINCENT is about 200 ft. high, having a convent, light-house, and other buildings on the summit. A good offing should be kept off this Cape, as the currents generally set strong along shore, with a tendency towards the Cape.

Light. Cape St. Vincent Light *revolves* every 2 minutes; 220 ft. high; visible 20 m. Lat. $37^{\circ} 8' N.$, lon. $9^{\circ} 0' W.$

Sagres Point. Shelter from N. winds can be found E. of this point in 11 fathoms, about $\frac{1}{2}$ m. from the shore; but, directly the wind changes, vessels should leave.

Lagos Bay also affords anchorage during N. winds. Large vessels should anchor to E. of Piedade Point in 12 to 15 fathoms. Springs rise 13 ft.; H. W. F. and C. at 2 h.

CAPE ST. MARY is the S. island of several, low and sandy. A light-house stands on it. Vessels in the vicinity of the Cape should not approach the coast in thick weather, as the water rapidly shallows towards the Cape.

There is no port between Cape St. Mary and Cadiz that a vessel of any size can take without a pilot, and anchorage off them can only be obtained in fine weather. The bay between these two places is to be avoided.

Guadalquivir River has a light on its S. side, *flashing* every minute; elevated 220 ft.; visible 22 m. It is 12 m. to N. of Cadiz, and a good landmark for that port.

CADIZ BAY, between Rota and Cadiz, is $5\frac{1}{2}$ m. wide, and between Cadiz and Sta. Catalina 3 m., but rocks and shoals make it much narrower for navigation. In approaching from W., the first land seen will probably be the mountains of Ronda, Ulrique, and Medina. Ronda is the highest of an extensive chain 24 m. inland. Ulrique is not so distant, but less conspicuous. Medina, a pyramid hill, is lowest, but near its summit has a remarkable tower. The houses of Medina on the W. slope of the mountain appear as a white patch. Beva tower, 6 m. to N. of Rota, is also a good mark on this coast, as it can be seen far off.

Rota is a small fortified town, with a *fixed* White light on the mole. A reef extends from the point and shoal water to **Rota Reef**, a patch with $3\frac{1}{2}$ fathoms. A *Red* buoy is on its S. point, S.S.E. $1\frac{1}{2}$ m. from Rota. A rocky shoal also extends $1\frac{1}{2}$ m. to the W.

St. Sebastian is a small fortified island, with a light-house $\frac{1}{2}$ m. W. of Cadiz. Beyond this, to N.W. round to S.W., for about $\frac{1}{2}$ m., is shoal water.

Cochinos and Puercos are rocky banks almost extending from the N. point of the shoal off St. Sebastian round the point of Cadiz, and meeting the shoal water which lies to the N. and E. of the town. On the Cochinos a bell-buoy is placed.

Diamante and Galera are two rocky shoals lying at the entrance of the harbour, and are $\frac{1}{2}$ m. in extent, N.E. and S.W. On the Diamante the shoalest water is $2\frac{1}{2}$ fathoms. The Galera has only $1\frac{1}{2}$ fathoms, and on its N. end there is a Red buoy in 5 fathoms, bearing W. by N. $1\frac{1}{2}$ miles from Santa Catalina Castle. Between the shoal and castle there is a good 5 fathoms channel, the N.E. entrance to the harbour.

Lights. Cadiz Light, on W. tower of St. Sebastian, is *fixed*, White, flashing Red every two minutes; elevated 150 ft.; visible 20 m.; lat. $36^{\circ} 32' N.$, lon. $6^{\circ} 19' W.$ Puerto de Sta. Maria has a small Red light, 5 m. to E. of Cadiz.

DIRECTIONS. Coming from the N., the light-house of St. Sebastian should not be brought to bear to S. of S.S.E. until you are well to the S. of Rota. In fine weather, on approach of night, a vessel may anchor with light-house S.S.E., and Santa Catalina Fort E.; in 10 or 11 fathoms. Enter the harbour between Galera shoal and Santa Catalina Fort, with Puerto Real church steeple in line with the S. hummock of Marrucco hill, until St. Domingo steeple in Cadiz is well open of Phillip Point (with flag staff and battery). The vessel is then within the shoals. If beating in, do not open any part of Marrucco hill on either side of Puerto Real.

Vessels entering between the Puercos rocks and Diamante shoal, should keep Medina and Puerto Real steeples in line bearing about S.E. $\frac{1}{2}$ E., until the gates of St. Domingo open of the low point of Phillip; or until the small mole of Seville gate is open of the point; when the lead will guide to a convenient anchorage.

With a beating wind, the Diamante should not be approached nearer than to bring the S. end of Medina on with N. end of Puerto Real. In standing to southward the N. end of Medina should not be brought southward of the S. end of Puerto Real.

WINDS. The sea breezes vary from W. to N.N.W., and are generally strongest at F. and C. of moon, when they not unfrequently blow during the whole night. They set in most commonly with the flood, and are of less strength when the tide makes near noon; indeed, at that period calms are not uncommon throughout the day. The land wind seldom reaches the anchorage.

The S.E. and E. winds are most dreaded by the inhabitants, but they are by no means so bad in their effects as the S.W. and W. gales, which send a heavy sea into the bay; whereas the E. wind, being off-shore, seldom creates a swell. These E. winds commonly set in at F. and C. of moon, and blow with great violence; they occur seldom in the winter months, and generally commence in May or June, with intervals of two or three weeks, and their average duration is three to five days. They are oppressive in the extreme. The thermometer rises 10° or 12° in a few minutes after the hot wind begins, and soon ranges from 84° to 92° Fahrenheit.

TIDES. It is H. W. at Cadiz, F. and C., at 1h. 45m.; springs rise $9\frac{1}{2}$ ft. to 11 ft., and neaps 6 ft. The tides are generally regular except in winter after W. gales, which not only force a large quantity of water into the port, but cause the time of high water to be 2 hours later than ordinary springs, and the flood to run 8 hours and the ebb only 4. At the entrance of the channel the first of flood sets S.S.E.; at half tide directly through towards Puntales; and the last quarter, from the light-house towards Santa Maria. The ebb sets nearly opposite. In the anchorage off the city, the first hour of flood, and the last hour of ebb, generally sets from Phillip Point towards Santa Maria, and the remainder of the tide in a S.S.E. and N.N.W. direction.

Near Frayle, Puercos, or Cochinos, the tidal stream sets strongly over these dangers. The velocity at springs is from $1\frac{1}{2}$ to $2\frac{1}{2}$ m. an hour, and at neaps from 1 to $1\frac{1}{2}$ m.

Pilots are to be had off Cadiz, but vessels cannot depend on finding them at night.

CADIZ TO CAPE TRAFALGAR. Off this coast which from Cadiz runs S. for 25 m. to Cape Trafalgar, there are several dangerous rocky shoals having from $1\frac{1}{2}$ to $3\frac{1}{2}$ fathoms, and lying from 2 to 3 m. from shore. Vessels of heavy draught should not stand nearer than about 4 m., or into less than 15 fathoms, during fine weather, and 6 or 7 m. when there is any sea or unsettled weather. In rounding the dangers off the N.W. end of Cadiz, a vessel should not steer to the S. until the town of Rota bears eastward of N. by E., so as to avoid a 3 fathom patch, bearing S.W. $1\frac{1}{2}$ m. from the light-house.

CAPE TRAFALGAR, a low, steep, sandy point having a tower and light-house, being separated from the high land to N.E. by a low sandy plain, appears at a short distance from the N.W. or S.E. like an island. High table-land, divided in two, rises abruptly to the E. of the Cape, and extends to the hills of Patria, about 600 ft. high. This, with a white round tower on the W. part, called Torre de Meca, forms the most remarkable land on the Spanish coast W. of Gibraltar.

From the Cape a dangerous rocky shoal extends to the W. nearly 2 m. Beyond this to N.W. and to W. are other shoals, the centre of the outer danger, with only $2\frac{1}{2}$ fathoms, being nearly 5 m. W.N.W. from the light-house.

Light. Trafalgar Light, lat. $36^{\circ} 11' N.$, lon. $6^{\circ} 2' W.$, is *revolving* every 30 seconds; elevated 170 ft.; visible 19 m.; on a conical dome, painted Red and Yellow.

TARIFA is a small peninsula, connected to the main by a causeway. It is level and moderately high, and surrounded by steep cliffs with deep water close to, except on the S. side, where a reef extends a cable off. The light-house, some small batteries, and other buildings are erected on it. The town of Tarifa, with about 6,000 inhabitants, stands on the shore $\frac{1}{4}$ m. N.W. of the Cape. Santa Catalina, a fort on rising ground on the neck of the peninsula, is surrounded by sand, and appears isolated.

Light. Cape Tarifa, which is the S. point of Spain, in lat. $35^{\circ} 59' N.$, long. $5^{\circ} 36' W.$, has a circular white light-house, 180 ft. above sea; shewing a *Red* fixed light, visible about 17 m.

To clear the **Pearl Rock**, keep Tarifa Light to the north of W. by N.

Cabezos Shoal is a cluster of dangerous rocks lying N.W. by W. 5 m. from Tarifa Light-house; they nearly dry at L.W., and in W. winds the sea breaks with great violence over them; but with E. winds or calms a ripple is all that is seen. Give them a wide berth. With Tarifa Light-house bearing E. by S., you will be $1\frac{1}{2}$ m. to S. of them. With Cape Plata bearing N., you will be the same distance to the W.

Tides.—It is H. W. at Tarifa, F. and C, at 1 h. 46 m.; springs rise $6\frac{1}{2}$ ft., and neaps $3\frac{1}{2}$ ft. The flood runs westward, and the ebb eastward.

The **BAY of GIBRALTAR** is formed between Carnero Point on the W. and Europa Point on the E., distant from each other 4 m., and having between them very deep water.

The land on the W. side of the Bay is high, rising over Carnero Point about 1,000 ft. above the sea, and continuing northward, gradually decreasing in height towards the head of the Bay.

The town of San Roque here stands on a hill 442 ft. high, about 2 m. inland; and to the S.E. of it is Mount Carbonera (with a tower on it) 970 ft. high; thence the land declines towards S.E. to the Neutral ground, at the end of which rises the Rock of Gibraltar.

Pearl Rock. This is a dangerous rocky shoal lying in the way of vessels bound into the Bay, formed of pinnacle rocks having 13 ft. water on them, with intervals of deeper water.

To pass southward of the Pearl, keep the tower of Gualmesí well open of the rocks of Acebuche Point until San Roque Church is open of Cabrita rock. San Roque, on a hill at the head of Gibraltar Bay, is conspicuous, and cannot be mistaken.

At Night. To mark the Pearl Rock at night, a strip of *Red* light, shown from Europa Light-house, is seen bearing between E.N.E. and E. It shows $\frac{1}{4}$ m. S. of the rock. Therefore, in approaching the Pearl at night from the W., a vessel should open Europa *White* light, until Verde Islet light is seen, when she may steer to the N. into Gibraltar Bay. A vessel from the E., whilst having Europa *Red* light in view, should not shut in Verde Islet Light until Tarifa Light bears northward of W. $\frac{1}{4}$ N., when she may steer for Tarifa.

Lights. The lights in Gibraltar Bay are Verde Islet (*Green*), two Gibraltar Mole lights (*Red*), Ragged Staff (*Green*), and Europa Point (*fixed*, *White*).

Verde Islet Light, $\frac{1}{4}$ m. S.E. of Algeciras town, is *fixed*, *Green*; 62 ft. high; visible 5 m.; lat. $36^{\circ} 7' N.$, lon. $5^{\circ} 28' W.$

Europa Light, at the S. point of Gibraltar Rock, in lat. $36^{\circ} 6' N.$, lon. $5^{\circ} 21' W.$, and 150 ft. above sea, is *fixed* and brilliant; visible 15 m.

Getares Bay lies between Carnero and San Garcia Points. Both Points are skirted with rocks and should not be neared on account of Currents. Shelter may be taken in this Bay from N.W. and S.W. winds in 9 or 10 fathoms, sand, but with a change of wind vessels should leave immediately.

ALGECIRAS is sheltered from W. winds, and has good holding ground. A vessel of moderate size will have a good berth in 9 fathoms, mud, with Verde Islet on with San Garcia Tower; Fort Santiago W.; and the highest belfry of the town W.S.W.: distant 6 cables off shore. You may anchor a little to the N. rather than to S. of this position, as the depths are regular and not greater than 12 fathoms, mud. Large vessels anchor in 16 or 17 fathoms, muddy bottom, at a mile from shore, with Fort Santiago bearing W., and the light tower on Verde Islet S.W. Attention should be paid to keep a clear anchor, and vessels should leave when there is any sign of the wind blowing from E. or S.E. Approaching Algeciras, vessels should not pass San Garcia Point or Verde Islet nearer than $\frac{1}{4}$ m. as rocks extend from both.

GIBRALTAR. The Rock of Gibraltar forms the E. side of the Bay, and on its W. slope is the town. The Neutral ground is the sandy isthmus to N. of the Rock.

Anchorage. Vessels may anchor off the low Neutral ground in any convenient place according to their draught; but with the Devil's Tower (which stands at the N.E. foot) open of the Rock, to avoid the heavy squalls and eddies which descend during strong E. winds; and so as to have the steady breeze over the Neutral ground. With the church of San Roque nearly in line with Mala Point, and the Devil's Tower a little open, there will be from 15 to 18 fathoms water, good holding ground; further out the water suddenly deepens.

As S.W. winds blow into the Bay, and send in much sea, vessels during winter on an approaching gale, should either leave the anchorage for Palmones, or immediately let go a spare anchor, and otherwise make the vessel snug; from the neglect of this precaution, the shore of the Neutral ground has often been strewn with wrecks.

The bottom between the Old Mole and the Ragged Staff is foul, uneven and rocky; anchors are liable to drag or break; vessels should not anchor there: moreover during strong E. winds, heavy squalls and eddies blow down over the rock, causing a vessel to swing in every direction.

There is anchorage off Jumper's bastion, in 6 to 8 fathoms, sand, under lee of the New Mole.

DIRECTIONS.—A sailing vessel from the W., with W. wind, bound into Gibraltar Bay, should give a berth to Pearl Rock and Carnero Point as before directed. The current has a tendency towards the latter, and squalls come down from the high land over it.

With an E. wind and any sea, Carnero Point should be avoided, and the southern board continued until the vessel can reach the middle of the Bay on starboard tack; then keep in the steady wind, W. of squalls and eddies, which blow down over the Rock, and work up to anchorage.

If coming from the E. with W. winds, a vessel should work round Europa Point with the flood tide, standing but little off, and it will be passed in two or three boards. But with an E. wind, after rounding the Point, keep up the middle of Bay in the steady breeze beyond the reach of the squalls from the Rock. The edge of the bank at the Neutral ground is steep-to; at night the *Red* light at the New Mole will assist a vessel in anchoring.

Should the wind be fresh from E. and *southward* of E., the squalls on the W. side of the Rock will be from the S., a fair wind for a vessel bound for the New Mole. If however the wind be *northward* of E., the squalls will be from the N.; a vessel should then work up in the steady breeze until near the anchorage at the Neutral ground, and then run down for the Mole before the squalls under easy sail.

Eddy winds outside the Rock, caused by W. winds, are also dangerous. Vessels should keep out in the steady breeze when rounding Europa Point.

Tides. The stream of flood sets in round Europa Point towards Carnero Point, off which it divides, one branch continuing W., while the other trends N. along the W. side of Bay; the flood, sweeping by Europa Point, sets to N. along the E. side of Bay. The water which thus runs into the Bay on either side, re-unites at its head at about half flood, and causes a stream to the S. down the middle of Bay. H. W. at F. and C. occurs at 2h. 20m.; rise from 3 to 4 ft.

The stream of ebb sets in by Carnero Point to the N.E. nearly in the direction of Mala Point, and divides into two counter streams near the head of the Bay; one stream curves round the Bay to the W., the other to the E., and S.E., and at about half ebb the tide runs out on either side. These streams are occasionally checked by strong winds.

WINDS and WEATHER. W. winds occur in January and May; E. winds in July, August, and September. Calms are of rare occurrence and the winds often strong. The E. winds are different from those on the coast between Cape Trafalgar and Cadiz. They are squally near the land, but in the Strait are uniformly strong. In-shore, in the bays, a calm prevails both morning and evening; or the wind is light near the land, while outside blowing hard, especially in the middle of the Strait. E. winds, instead of being dry, as on the coast between Cadiz and Trafalgar, are generally accompanied by a mist, and the thicker the mist the stronger the wind. A mist over the land, especially over Gibraltar and Apes Hill, almost certainly indicates an approaching E. wind; and continues while it lasts.

During the fine season, E. winds are seldom attended with rain in the Strait; but on the heights of Gibraltar and Apes Hill (African coast) rain sometimes falls while there is fine weather in the Strait. Again, in the fine season, particularly in June, if, after a strong E. wind, large white clouds are collected about the land in round masses, with light S.W. or W. wind, and a thick fog bank is formed in the W. part of the Strait, it gradually envelopes the whole Strait. These fogs are sometimes thick and wet, but only of a few hours duration, and disappear as rapidly as they form.

W. winds in the fine season are generally moderate, the sky is clear, and the land distinct; but if they freshen, it soon becomes overcast, and squally with rain, with a considerable sea in the Strait. In general, W. winds in the fine season (except a breeze now and then from S.W., which

may veer to W. and N.W., and of short duration) bring fine weather for navigation. In Oct., Nov., or Dec., a strong breeze may occasionally occur from the W. These winds are attended with much moisture at the W. entrance of the Strait, but are mostly dry at Gibraltar. When the summits of Gibraltar and Apes hill, after being covered with mist during the E. wind, become clear and conspicuous, it is a sign of a coming W. wind.

In the fine season E. winds in the Strait are always fresh, while the W. winds are mostly moderate. But E. or W. winds have this peculiarity, that near the coast they follow its direction. Thus, when the wind is due W. in the Strait, it becomes N.W. near the coast of Spain, while near the African coast it is S.W. In like manner, E. winds in the Strait draw to the N.W. near Spain, and to S.E. near Africa. As the wind penetrates the Strait, it becomes stronger in the narrow part. Thus, although the E. wind may be light between Gibraltar and Ceuta, it blows hard between Tarifa and Cires Point, and in all the W. part of the Strait. And in the same manner W. winds, moderate between Cape Trafalgar and Cape Spartel, attain strength S. of Tarifa, and preserve it in all the E. part of the Strait.

In the bad season, that is, in Feb., March, and April, W. winds are squally, and attended with heavy rain. In this season, also, the E. gales veer to the S.E. with torrents of rain; the weather then is nearly always murky, and the sky overcast. The worst winds of the Strait are the S.W., and squalls (by which they are attended) change suddenly to W., or N.W., and even to N., sometimes N.N.E. When they remain between N. and W., they generally diminish in strength; the squalls are generally attended by rain, and at times by thunder. Between the squalls there are intervals of fine weather, with moderate wind. If the wind settles between N.W. and N.E., it goes down, and fine weather ensues. But if, after suddenly changing to N.W., the wind backs round to S.W., it mostly redoubles its force and brings rain in abundance.

Winds from N.W. round by N. to N.E. are rare in the Strait; but when moderate they are attended with fine weather. In the bad season they blow with force; but the local mariners say that although N.W. winds may blow hard outside, they are not much felt in Tangier Bay. Also in this season N.E. winds frequently bring rain, and when they veer to E. or S.E. they generally freshen to a gale. The S.E. is the rainy wind of the Strait, and is called the *Levanter*. These winds are squally and shift suddenly to N.E., and even to N. In these changes they blow hard, but at times in changing to N.E. they moderate; and if they again veer quickly to E. or to S.E. the bad weather will continue.

Thunder storms are most frequent in Sept. and Oct.; they are not so common in April, May, and Nov., and rarely happen in other months. They most frequently occur in the afternoon or at night, when the weather is uncertain, and the wind variable. Heavy gusts of wind, but of short duration, blow from opposite points, as from E. and W., and clouds are seen at different elevations, pursuing opposite directions, which is a sign that the evening may have a storm. Mariners affirm that in Sept. and Oct., about 15 or 20 m. outside the Strait, squally weather, frequently with thunder, is met with.

The squalls are attended with much rain, with intervals of fine weather and calms or light winds. When these squalls are strong, they are somewhat like whirlwinds, and shift rapidly through 4, 6, or even 8 points, blowing harder as the changes are more rapid and considerable.

In the Strait of Gibraltar, the ocean swell is also felt. As the long seas penetrate the Strait, especially if from the W., they assume the direction of the coast. The consequence is that neither on the African coast nor on the Spanish coast is there any really quiet anchorage where shelter is to be had.

Whenever a swell is observed in the Strait and bays, either from N.E. or S.E., it indicates an approaching E. wind. When the swell comes from N.W. or S.W., expect a W. wind. While under sail in the Strait with an E. wind, be prepared for squalls, which at times are heavy to the W. of Gibraltar, as well as W. of Tarifa and between Cape Trafalgar and Cadiz; they also occur on the opposite coast, near Apes Hill, as far as Cires Point, off Malabata Point, and in Tangier Bay. In like manner, with W. winds, squalls are heavy to the E. of Gibraltar, and near Apes Hill, Ceuta Bay, and Tetuan (African Coast).

Barometer.—During summer, the barometer changes little in the Strait, but in winter seldom deceives. When it falls, wind or rain may be expected. With winds from N.N.W. round by N. to E., it is generally high, and keeps so even when it rains. But as soon as the wind veers to the S., it falls; thus a rising barometer indicates a N. or E. wind, and a falling barometer a S. wind. S.W. and S.E. winds, being those which generally bring bad weather in the Strait, are indicated by a fall in the barometer. But frequently this fall is only on account of rain, for these changes of barometer are more generally followed by rain than force of wind.

AFRICAN COAST. (VARIATION 19° W.)

CAPE SPARTEL the N.W. extremity of Africa, and the W. limit of Gibraltar Strait, is a mass of black conical-shaped rock, which seen from the N. and S., appears detached like an islet. It is commanded by high land which reaches a height of upwards of 1,000 ft. South of the Cape the coast trends to S.W. by S. for more than 10 leagues; the land falls rapidly, forming an extensive plain, on which is Mount Nipple, remarkable by its isolation and conical form, about 4 m. to S. of Spartel. The Cape is skirted by a reef which extends off about 2 cables. At $\frac{1}{2}$ m. E. of the Cape is the light-house on a rock.

Light. Cape Spartel, at 312 ft. above the sea, exhibits a *fixed* White light, visible in clear weather at 20 m.; lat. $35^{\circ} 47' N.$, lon. $5^{\circ} 56' W.$

Vessels prevented from entering the Strait by strong E. winds may find shelter at the anchorage of Jeremias, about $2\frac{1}{2}$ m. S. of the Cape. At a mile from the shore there are about 20 fathoms water, over clean sandy bottom, and good holding ground. With these winds, keep over on the African coast rather than the Spanish, as it is free from danger, and vessels are in a better position to profit by any change in the direction or force of the wind, and for this purpose it is prudent to keep under sail.

The land to N.E. of Spartel is high with uninterrupted steep cliffs to Frailecito Point, off which is a small black islet surrounded by rocks. The coast thence turns E. with less cliffs, but high and irregular to Judios Point; which is known from seaward by its white cliffs. The coast between Cape Spartel and Judios Point is steep-to.

Judios Bay, with a small sandy beach, the only one on this part of the coast, is nearly $\frac{1}{2}$ m. E. of Judios Point.

Tangier Bay. A white and reddish cliff extends from Judios Bay to Tangier Point, which seen from a distance appears like a patch in the middle of the coast. The shore is here skirted by reefs. The town of Tangier stands by the sea, and on the W. side of the Bay; its most remarkable objects being the castle (la Casbah) and a mosque in the N.W. angle of the town. The houses standing above each other, being entirely white, are seen at some distance; but to a vessel from the W. the table-land of Marchan prevents the town from being seen until abreast of it.

The bay between Tangier and Point Malabata is 3 m. wide and 1 deep; the latter bears from the former point about N.E. by E. The Bay from the offing appears much deeper than it is, from being surrounded by high land; nearly all its shore is a clean sandy beach, with from 5 to $6\frac{1}{2}$ fathoms water at 3 cables distant. An isolated conical hill, not a mile inland, called Direction Mount, lat. $35^{\circ} 46' N.$, lon. $5^{\circ} 48' W.$, serves as a mark for the anchorage; and a little E. of it is another hill not so high, on which is a whitish tower.

Bouree Rock is a sunken rock, lying about $\frac{1}{2}$ m. from the S.E. shore of the Bay. It is about a cable in extent, the least water on it is 3 ft., but the sea seldom breaks on it. From its shoalest part, Mount Direction bears S.W. $\frac{1}{2}$ S., White Tower E. of Mount Direction S. by W. $\frac{3}{4}$ W., and Fort Arabi-el-Said S.E. by E. $\frac{1}{2}$ E. There are from 4 to 7 fathoms water between the rock and the shore, and about the same depths near its outside.

ANCHORAGE. Tangier Bay is the only anchorage on the S. coast of the Strait where any size vessel may anchor. Exposed from N.W. to N.E., it affords security from other winds. But only N.W. winds, which send in much sea, are to be apprehended. The swell is felt even with the wind at S.W. Winds between N. and N.E. do not last long nor send in much sea. A vessel may anchor anywhere in the middle of the bay in about $7\frac{1}{2}$ fathoms sand, good holding ground, with Mount Direction bearing about S.S.W. A large vessel should keep Judios Point open of the fort in ruins on the E. point of Judios Bay, and also Europa Point open of Malabata Point. During the winter months vessels should be prepared to leave.

A vessel entering Tangier Bay during an E. gale will find convenient anchorage off a small beach about a mile S. of Malabata Point, in 8 or 10 fathoms, where she will be better sheltered, and in a fair position for continuing her voyage when the wind slackens or changes. When working out of the Bay and standing towards old Tangier, keep Europa Point open of Malabata Point to avoid the Bouree Rock.

TIDES. It is H. W. at Tangier Point, F. and C., at 2 h. 13 m.; springs rise 9 ft., and neaps 6 ft. (See Eddies and Counter-currents, at p. 12.)

Malabata Point is a bold prominent headland terminating in cliffs and bordered by rocks, having on it a battery and a circular white tower, the land rising from the point nearly 800 ft. high. At nearly 6 cables from Malabata Point and N. $\frac{1}{2}$ W. from the tower, there is a rocky shoal with $3\frac{1}{2}$ to 5 fathoms, on it named the Almirante. There is generally a sea over it, and with

strong winds from the W. the water breaks. Between this shoal and the shore there are from 9 to 12 fathoms; no vessel should use the channel except in cases of necessity, but give the Point a berth of a mile in 12 to 15 fathoms water.

The coast from Malabata Point to Point Al Boassa, $3\frac{1}{2}$ m., is foul; having several rocks and banks off it, but no danger for a ship keeping $1\frac{1}{2}$ to 2 m. off shore. Between Al Boassa and Point Lanchones (nearly 12 m.) the shore is clearer, and may be approached with safety to a mile. From Point Lanchones the coast line is irregular to E.S.E.; but there is no anchorage for ships in the bays until reaching Ceuta Bay.

SIERRA BULLONES, or APES HILL. This celebrated mountain, called by the Moors, Jebel Mousa, stands near the E. entrance of the Strait, and with the Rock of Gibraltar on the other side, form excellent marks. It is rugged in outline, very precipitous, and ascending in sharp inaccessible cliffs to its summit, which is 2,800 ft. above the sea; lat. $35^{\circ} 53' N.$ lon. $5^{\circ} 28' W.$

Leona and Blanca Points form the extremity of Benzus Bay; the first is high and level, with a tower on the summit, and ends in a cliff; the other is high, steep, and of dark reddish colour, with the ruins of a tower on it. Nearly $\frac{1}{2}$ m. N.W. from this point is a rock with $2\frac{1}{2}$ fathoms on it; to clear which, keep the whole of the walls of old Ceuta open of Bermeja Point. A mile S. from Blanca Point is Marabat Mountain, 1,080 ft. high, with a white tower on its summit. At its E. base are the ruins of the old town of Ceuta.

CEUTA BAY, $2\frac{1}{2}$ m. wide, formed between Bermeja Point (a reddish point with the ruins of a tower), and Santa Catalina Point, is a mile deep, but affords no shelter for large vessels, except from S.W. winds. Fresh S.E. winds cause much sea, and those from the W. send down heavy squalls over the mountains. No vessel should seek shelter in this Bay, and much less with E. or W. winds with any Northing in them. At a long mile from Bermeja Tower is the low point of Benites, with reefs extending from it; the outermost are the Campos, two large rocks above water, about 2 cables N.E. of Benites Point. The Campo rocks are surrounded by sunken rocks, and shallow water extends nearly a third of a mile from the shore.

Santa Catalina Point is low, projects to N., with rocks and reefs, and a fort of the same name commands it. The rocks off the Point are high, and extend about $1\frac{1}{2}$ cables to the N. At rocky bank with $3\frac{1}{2}$ fathoms, known as Queen Isabel Bank, extends about $\frac{1}{2}$ m. N. of the rocks, and in heavy seas the current sets very strong over it. At the distance of 4 cables from Santa Catalina Point the depth varies from 11 to 23 fathoms, rocky bottom. This point bears S. $\frac{1}{2}$ W. distant about $12\frac{1}{2}$ m. from Europa Point.

CEUTA. The modern town occupies the N. and W. slope of the peninsula and the isthmus of Ceuta, in the form of an amphitheatre. The peninsula, or Almina, has seven small hills, which ascend gradually E. to the largest and highest, called Monte del Acho, on the summit of which is Acho Castle, 630 ft. above the sea; its walls and buildings are seen far off.

The best anchorage in Ceuta Bay is N.W. of the new town in 8 to 13 fathoms, sand and rock. The Obispo, or principal street, should be kept open; it begins on the N. side of the Governor's house, the most conspicuous on the Almina, and near the belfry of San Francisco Church, at the high end of the street. A vessel at this anchorage should be prepared to leave should it come on to blow hard from E. or W. At the W. end of the town there is a mole, to which small craft may be secured; about 2 cables off it small vessels anchor in 6 and 7 fathoms.

Almina Point, the E. extreme of the Almina de Ceuta, is low, being the termination of Mount Acho. On the summit of the hill, called the Mosqueros, stands the light tower. From Almina Point the coast turns S., and soon after S.W. and W., forming the great Bay of Ceuta, in which vessels find good shelter against winds off the land, or from S.W. to N.

Light. Ceuta Light is *revolving* every minute; elevated 480 ft. on Mosqueros Hill; visible 23 m.; lat. $35^{\circ} 54' N.$, lon. $5^{\circ} 17' W.$ Variation of compass, $19^{\circ} W.$

WINDS in Gibraltar Strait. The Strait includes the European coast from Cape Trafalgar to Europa Point, and the African coast from Cape Spartel to Ceuta. The prevailing winds are either from the E. or W., and are influenced by the trend of the coast on either side. Thus, when the wind is from the E., it varies between N.E. and S.E., and when from the W., between N.W. and S.W. From observations made at Gibraltar during six years, W. winds prevailed in the proportion of 16 to 18 of E. winds, while there was only an average of one day of variable winds in each month. May has the most W. winds. Calms are very rare; the winds are often strong.

Feb. and March are the only months generally bad for navigation. About the end of Oct. and Nov., bad weather at times prevails, in the short rainy season, which lasts from 15 to 20 days. In Jan., Feb., and March, gales from S.W. (shifting to W. and N.W.) and from S.E., are frequent; these are at times very heavy, accompanied by rain, and follow each other at short intervals.

On the coast between Cadiz and Cape Trafalgar, the E. winds are squally, with a clear sky overhead. These winds are dry; a white mist hangs over the land, thickening near the horizon, and continues while the E. wind lasts; also indicates its approach. The absence of dew, and the rise and setting of sun behind a cloud bank, indicate an E. wind. In the fine season, while the E. wind prevails, it is generally more constant and strong than the W. wind. It may last over a fortnight, and blow hard all the time. The native seamen say, that it always blows for periods of 8, 6, or 9 days.

In general E. winds rapidly freshen, at times becoming a gale in a few hours. Near land they are often squally. At a distance from land the breeze is steady, and gradually goes down.

At Cadiz, E. winds called *the Medina*, often blow strong. In April, they are accompanied by heavy black clouds, and often with rain and hail. They are squally sometimes, with thunderstorms. They slacken at evening, freshen in morning, and become strong during day, with occasional sudden gusts at night.

S.W. winds, the most dangerous, are generally announced by a fall in the barometer, and commence from the S. Different from E. winds, they take a certain time to veer to S.W., from whence they blow hardest. Like the S.W. winds of the Bay of Biscay, they shift suddenly to W., and even to N.W.; if they continue at N.W., the weather becomes fine, but with heavy squalls at intervals, and sometimes thunder storms; they continue strong and generally go down at N. This account of the W. wind specially applies to winter. In the fine season of April and May they are generally moderate, with fine weather.

CURRENTS. The water between Cape St. Vincent (Portugal) and Cape Cautin (Africa), is in motion at the rate of from 10 to 20m. a day towards the Strait of Gibraltar, thus causing a general current to the E. which is stronger in mid-channel than on either shore. On the coast of Spain the stream runs to the S.E.; on the coast of Africa to the N.E.; in the centre E.; and it attains its greatest velocity between Tarifa and Cires Point. Near Tarifa it runs to the S.E. towards the African shore, and off Cires Point to the E.N.E.: thus there is a stronger current along the coast of Africa than the coast of Spain.

The general E. current is accelerated by the ebb, and retarded by the flood of spring tides; in the former case it attains a velocity of 5 m. an hour, between Tarifa and Cires Points. It is retarded also by long E. winds; but it preserves its E. direction from Tarifa to Europa Point. The E. current in the middle of the Strait is sometimes checked or reversed, when an extraordinary equinoctial spring tide combines with the wind. (*See Tides*, p. 7.)

It has been found that the usual force of current in the middle of the Strait, off Tarifa, is from 2 to 3 m. an hour with fine weather and no tide; in the vicinity of Tarifa a little more than 1 m.; and 2 m. an hour on the coast of Africa. Close to Tarifa Point, when the ebb at springs sets E. with the current, they run 4 m. an hour in a S.E. direction. At one league N. of Alcazar Point (African coast), they run to the E. 5 and 6 m. an hour.

Close to Tarifa, the flood at springs runs W. 2 m. an hour; but at neaps about 1 m. This flood-stream is like a thin wedge, for at $\frac{1}{4}$ m. off the Cape the general current sets E. At springs the stream of tide near the coast and bays runs at the rate of $1\frac{1}{4}$ to 2 m. an hour, but at neaps it nearly ceases. These in-shore streams always run much faster on ebb than on flood, thus showing the effect of the general current.

Thus it will be seen that there is a regular ebb and flood tide which runs E. and W., within very narrow limits, on the Spanish coast. When the water is falling, the whole stream is running E., but when it is rising, the tide close to either shore sets W.

Off the salient points, such as Europa, Tarifa, and Trafalgar, on the coast of Spain; and Spartal, Cires, and Leona, on the coast of Africa; the stream of tide turns at the moment of slack water. As soon as the tide begins to rise, the stream commences running W.; and as soon as it begins to fall, it commences running E. As a general rule the tide sets W. along shore in the Strait from the time the moon rises till she is on the meridian; then E. until she sets, then W. until the lower culmination takes place, then E. until she rises.

EDDIES or COUNTER CURRENTS, so numerous in Gibraltar Strait, generally occur near the most salient points of both coasts, and near their off-lying banks. In Tangier Bay the ebb stream strikes against Malabata Point, a portion of it turns to the S. and runs along the whole shore of the Bay in a direction opposite to that of the current outside. In the Bay between Points Al Boassa and Cires, the ebb stream, which is strong off the latter point, produces also a counter current, to the W. So also at Cala Grande; with the flood stream all the water runs to the W., along shore, and the Bay of Cala Grande has this great advantage, that owing to this counter current, the stream near shore runs continually to the W. This is of importance to sailing vessels working through the Strait from E. to W. with W. winds.

In Ceuta Bay the counter currents are much the same as in Tangier Bay, but weak.

Gibraltar Bay has peculiar counter currents. The flood stream enters the Strait by Europa Point, and sets towards Carnero Point; off which it divides into two branches, one of which continues on its W. course; another takes the W. shore of the Bay, making a N. course from Carnero along by Algeciras. As the flood passes Europa Point a portion of the stream branches N. past Gibraltar Harbour to the head of the Bay. It there meets with the stream from the W. side; thus a current to the S. is established down the middle of the Bay which joins the flood stream in the Strait.

Thus, during the flood, there are actually three streams in the Bay, two of which run N. along either shore, and, uniting at the head, form together a current running S. out of the Bay. The stream on the W. side (much stronger than that on the E. side of the Bay) commences at Point Carnero as soon as the flood makes there; in about an hour it reaches Getares, and in two hours penetrates to Algeciras. The stream on the E. side of the Bay does not reach the anchorage off Gibraltar until three hours after the flood makes; thus the flood stream never lasts so long as the ebb, nor does it run so strong.

When the ebb commences in the Strait, the tidal stream enters Gibraltar Bay round Carnero Point, and runs N.E. across the Bay. Having gained the head of the Bay, it divides; one part runs along shore towards Gibraltar; the other, the larger branch, sets round the head of the Bay and along the W. shore by Algeciras to the S. Thus on the ebb, as on the flood, there are three currents in the Bay. These streams change regularly with every tide, and about two or three hours after high and low water; but they are subject to variation, as the wind considerably influences them, and their velocity depends much on its force.

Off Carnero Point the tide runs almost always either N.W. or N.E., and consequently in general towards the shore. Carnero and Acebuche Points are difficult points for vessels to get round from the E. Carnero is the most dangerous in the whole Strait; many accidents occur on this Point, in consequence of the currents.

On the E. side of Tarifa the flood tide is never sufficiently strong to cause any counter current; but with the ebb, the stream which runs S.E. occasions a counter current along the coast to the W.; this at times is felt some distance E. of Tarifa.

Tide Races are numerous in the Strait of Gibraltar. They are generally found off all salient points where the trend of coast changes, and near the banks. They form suddenly without warning, and the sea gets up like water boiling, short, irregular, and deep; the wind, of course, helps to form them. These races are dangerous to boats and even to small craft. The most turbulent races are generally where a point is most acute, and off which the water is not so deep; and they are generally formed at half tide, when the current is strongest.

In some parts the stream of flood, as well as ebb, produces a race; in others, it only comes on the ebb. The points on the coast of Spain where races are found are,—Cape Trafalgar, Cabezos shoals, the S. point of Tarifa, Frayle Point, the Pearl Rock, and Europa Point. On the coast of Africa, Cape Spartel, Points Malabata, Altares, Al Boassa, Cires, Leona, and the N.E. Point of Ceuta.

The most violent race is off Cape Trafalgar, and it forms there both on the flood and ebb. It extends a good distance off the Cape to W.S.W., crossing the bank of Aceitera, and over all the small banks of the Phare. This race, more violent than any in the Strait, is probably caused by the sudden change of direction in the coast, and the number of banks off it.

At every half tide a race is also formed on the Cabezos, or near them; it gets up even in calm weather; and in bad weather, with much sea on, extends over the whole breadth of the Strait, from the Cabezos to Malabata Point, on the African coast; on this line the Strait is shallowest, and pilots call it the Race of Bajas.

The race off Tarifa Point is of limited extent; on the ebb it extends to S.E., but with the flood to S.W. It appears at every half tide, and that on the ebb is more than that on the flood. The races off Frayle and Europa Points are much the same, but less violent; the first resembling that of the Cabezos, and the last that of Tarifa.

On the African coast, off Cape Spartel, Judios Point, and Tangier Point, they are of small extent, but found both with ebb and flood. Between Malabata and Al Boassa Points, over the Almirante, Phoenix, and Jaseur banks, are the worst races on African coast, both on flood and ebb; and they reach across the Strait to the Cabezos. The races off Cires, Leona Points, &c., as far as Ceuta, are of small extent; but sometimes violent, when the ebb tide is strong.

PASSAGE FROM ENGLAND TO GIBRALTAR.

(VARIATION AT USHANT AND FINISTERRE, $22\frac{1}{4}^{\circ}$ W.; AT ST. VINCENT, $20\frac{1}{4}^{\circ}$ W.)

The Admiralty Pilot Charts fully explain the winds and currents likely to be met with on this short and open passage; but it is necessary to offer some remarks to assist the mariner who may not have Pilot Charts.

From either the English or Bristol Channels, the course for a steam-vessel is very clear, giving heed to prevalent winds and currents; these are described more fully for the sailing vessel in another Section, at p. 34. Here we need not consider the class of vessel separately.

The Bay of Biscay, from Ushant on the N.E. to Cape Ortegal on the S.W., is about 300 m. across, and 240 m. deep. The central part of the Bay has very deep water; the 100 fathoms line of soundings passes about 65 m. S.W. of Ushant, and skirts the W. coast of France at nearly the same distance, curving to within about 35 m. of the S.E. angle of the Bay. Along the coast of Spain, at 15 m. from land, no bottom is found with the deep-sea line.

N.W., West, and S.W. winds, cause a heavy swell and a current, to which attention should be given. The E. current of the Atlantic strikes the land near Cape Ortegal, and divides into two branches; the N. portion flowing E. along the coast of Spain, then N. along the W. coast of France, where it is felt at 30 or 40 m. off shore. In about lat. $48^{\circ} 20'$ N., its direction is nearly N.W., passing 15 or 20 m. W. of Ushant, and then across the entrance of the English Channel. It runs from a half to one mile per hour, and varies according to lately prevailing winds.

The other branch turns gradually to the S.E. and S. along the coast of Portugal until past Cape St. Vincent, when it runs E. towards Gibraltar Strait. It must not, however, be thought that the current along the W. coast of Spain and Portugal always sets to the S.; for, during and after S. gales, it will probably be found setting to the N. The mariner will use caution in crossing the Bay, and make allowance for either outset or indraft; but especially the latter, when standing to the S. during thick weather past Cape Finisterre.

As before remarked, the prevailing winds between England and Cape Finisterre are N.W., W. and S.W.; and, as these winds bring the Bay of Biscay under the lee, it is advisable on leaving England to make westing enough to fetch well to windward of Cape Finisterre; particularly in the first two and the last three months of the year, when S.W. gales are frequent on the coast of Portugal. In the other months, the distance of offing from Cape Finisterre is not so important, as advantage can be taken of the N. and N.E. winds which then prevail along that coast. But these latter winds must not be expected S. of Cape St. Vincent, where the winds are not so regular; land and sea breezes, however, prevail there in the summer. Gales on the coast of Spain and Portugal in winter are generally preceded by a heavy swell; and calms after S.W. winds betoken bad weather.

From the Mediterranean to England. With strong W. winds a vessel should not attempt working out through the Strait, on account of the strong E. current; but should come to anchor in Gibraltar Bay. The winds and currents in the Strait have been described (p. 11). We need only add this caution.—Vessels going within gun-shot of Spanish forts, Tarifa, Verde Islet, &c., must hoist their national colours.

From Gibraltar to England in winter months, good Westing from Cape St. Vincent should be made; but in summer a moderate distance from the land, to avoid the local N. winds, is all that is needed.

Cape St. Vincent Light (revolving every 2 minutes) bears N.W. (by compass) from Tarifa, distant 57 leagues. With a beating wind, in foggy weather, when the lights between Capes Trafalgar and St. Vincent cannot be sighted, the deep-sea lead will be a good guide, not shoaling under 40 fathoms on the northern tack.

Cape da Roca Light (revolving every 100 seconds, alternately Red and White) bears N. by E. 36 leagues from St. Vincent, and the Burlings Light (revolving every 3 minutes) is 13 leagues further to N.N.E. In foggy weather, soundings of 45 to 50 fathoms may be taken when 5 leagues off the coast between these two lights, and gradually shoaling towards shore.

CAPE FINISTERRE LIGHT (revolving every 30 seconds) bears from the Rock of Lisbon N.N.E. 83 leagues. This coast, which has good lights at about every 20 leagues, may be approached on the inshore tack into 40 fathoms, except close to the Farilhoes Islands, to N. of the Burlings, where no bottom is obtainable with 100 fathoms when close-to. The deep-sea lead should always be used in thick weather.

African Rock, the N.W. sunken danger off the Spanish coast, lies 12 m. to N. of Cape Finisterre Light, and must be considered when rounding the Cape. Ships are not to the N. of this rock till Cape Villano *fixed* light bears eastward of E.N.E. The bank of soundings extends not more than 2 or 3 leagues off this rocky coast.

USHANT REVOLVING LIGHT (showing alternately a White light twice, and then a Red light, at intervals of 20 seconds) bears N.E. $\frac{1}{4}$ E. about 122 leagues from the N.W. point of Spain. The French coast is studded with good lights. **Les Pierre Noires**—4 leagues to S.S.E. of Ushant—have now a light, *flashing* Red every 10 seconds; and to the E. of them stands the *revolving* light of St. Matthieu, marking the N. side of Brest Harbour.

Ile de Sein Light, 9 leagues to S. of Ushant, is *fixed*, and *flashes* every 4 minutes, when it is visible 18 m. off. The Chaussee de Sein, a dangerous reef, extends 3 leagues to W.N.W. from this light. The light on Penmarch Point (*revolving* every 30 seconds) stands 8 leagues further to S.E.; and Belle-Ile Light (*revolving* every minute) is nearly 20 leagues to S.E. of Penmarch.

In foggy weather, if a homeward-bound vessel should sight any of these lights on a N.E. bearing, and the lead gives a less depth than 60 fathoms, she will know herself to be to the S. of Ushant and must haul off shore. The soundings to the W. of Ushant are 63 to 65 fathoms. The sad loss, somewhere off this French coast, of the *Ispahan* Steamer in February, 1872, leads us to caution navigators to use the deep-sea lead. Soundings of 90 fathoms are to be had within 50 m. of the above lights, and 70 fathoms at 20 m. off.

A run of 100 leagues from Cape Finisterre, on any course between N.N.E. and E.N.E., will put a vessel on the English-Channel bank of soundings in 100 fathoms, whence it gradually shoals to the French and English coasts.

CHAPTER II.

GIBRALTAR TO ADEN.

SPANISH COAST—MALAGA—CAPE DE GATA—CARTAGENA—ALBORAN ISLAND—BALEARIC ISLES
SARDINIA—AFRICAN COAST—CEUTA—ALGIER—TUNIS—SICILY—MALTA—CANDIA—TRIPOLI—
EGYPT—PORT SAID—SUÉZ—JIDDAH—MOCHA—ADEN.

(VARIATION AT GIBRALTAR, 19° W.; AT MINORCA AND ALGIER, 16° W.; AT MALTA, 12° W.)

Numerous light-houses on the coasts of Spain and Africa, and on adjacent islands, make navigation very easy now.

Europa Point Light, in lat. $36^{\circ} 8' N.$, lon. $5^{\circ} 21' W.$, is 150 ft. above sea, *fixed*, White, but shows a strip of *Red* light towards Pearl Rock, seen bearing E.N.E. to E.

Doncella Point Light, by the town of Estepona, is *fixed*, and *flashes* every four minutes; 60 ft. above sea; visible 12 m. It stands 7 leagues to N.E. of Europa Point. Along this coast vessels may anchor, with W. winds and ebb tides, about 1 m. off shore; but, with the flood, may work towards Gibraltar.

Marbella Light, about 5 leagues E. of Doncella, is *fixed*; elevated 55 ft.; visible 12 m.

Calaburra Light, on a prominent point, lat. $36^{\circ} 31' N.$, lon. $4^{\circ} 38' W.$, is *fixed*, and bright, *flashing* every three minutes; elevated 115 ft.; visible 16 m. The light-tower stands 44 ft. above the land, and bears E. by N. $\frac{1}{4}$ N. 14 leagues from Europa Point.

Malaga Light, $5\frac{1}{4}$ leagues N.E. by E. from Calaburra, is *fixed*, and bright, but gives a *Red flash* every two minutes; elevation 125 ft.; visible 18 m. **Velet (Old) Malaga**, $4\frac{1}{4}$ leagues E.S.E. of the other, has also a small *fixed* light, **Torrox Castle**, $7\frac{1}{4}$ leagues further E., has a brilliant *fixed* light, 94 ft. above sea; visible 15 m. H. W. at F. and C. at Malaga, at 12 h.

Cape Sacratif, the highest headland of this coast, lat. $36^{\circ} 41' N.$, lon. $3^{\circ} 27' W.$, and 32 leagues E. of Gibraltar, has a brilliant *fixed* light, giving a *flash* every minute; elevated 320 ft.; visible 24 m. Honda Cove, one league E. of Sacratif, has a small *Red* light.

Sabinal Point, in the same latitude, and 20 leagues E. of Sacratif, is low, with a light-house 100 ft. high. The light is *fixed*, and brilliant, *flashing* every two minutes; elevated 105 ft.; visible 16 m. Many wrecks occurred on this low point before the erection of the light-house.

Alboran Island is to S. of Sacratif, midway between Spain and Africa. (See p. 16).

Almeria Bay, between Sabinal and Cape de Gata, affords shelter against W. winds, off Roquetas Castle, which exhibits a small *fixed* light. Vessels may anchor in 15 fathoms, about one mile to E. of the light. Avoid the shoals which extend a good mile off Sabinal, and also the E. current which sweeps round the Cape, strongest on the ebb.

Cape de Gata Light-house, lat. $36^{\circ} 43\frac{1}{4}' N.$, lon. $2^{\circ} 13' W.$, is a white tower, 60 ft. high, showing a bright light *revolving* every half minute; on Corralete Castle, 195 ft. above sea; visible 20 m. This prominent part of the Spanish coast has dangerous currents, which vary in their set with the winds. The S.E. current is most prevalent, strongest on the ebb, and with W. winds. Port Genovés is about 4 m. to E. of the light; and at 3 m. further E.N.E. stands the lofty Point Loma Pelada, the first land seen on nearing the coast.

Mesa Point, 6 leagues E.N.E. of Cape de Gata, has a *fixed* light, giving a *flash* every two minutes; elevated 725 ft.; visible 20 to 25 m. A lofty range of mountains, about one league from the sea, extends from Cape de Gata to the N.E. for 20 m.

Cartagena, one of the best harbours in Spain, 26 leagues to E.N.E. of Cape de Gata, has a railway to Madrid. It has two port lights; and the sunken rock, off Escombrera islet, is buoyed. **Cape Tinoso**, 3 leagues to W. of Cartagena, has a brilliant *fixed* light, 480 ft. above sea; visible 20 m.; in lat. $37^{\circ} 32' N.$, lon. $1^{\circ} 7' W.$ Podadera Fort (on W. side of entrance to the inner harbour or Careening Bay called Espalmador) has a *fixed* White light; 200 ft. above sea.

Passing this and Navidad Fort about a cable off, in 7 to 9 fathoms, you open Espalmador Bay to the W., and can anchor in 6 fathoms mud. Escobrera islet has a small *fixed* light, 220 ft. high, which is $1\frac{1}{2}$ m. to S. of Podadera. H. W. at F. and C., at Cartagena, occurs at 10 h.

CAPE PALOS LIGHT-HOUSE, lat. $37^{\circ} 37' N.$, lon. $0^{\circ} 40' W.$, on a prominent point, 5 leagues to E. of Cartagena, has a brilliant light *revolving* every minute; elevated 263 ft.; visible 23 m. There is a small *fixed* light on Hormiga Grande islet, at $2\frac{1}{2}$ m. E. by N. of Palos. Vessels can take shelter against W. gales to the N. of the Cape with the revolving light S.S.W. and Hormigas light E.S.E. The current generally sets to S.E. off Cape Palos.

The Coast from Cape Palos trends to N. and N.E. to Alicante,* and onwards E.N.E. to Cape San Antonio, which is 28 leagues N.E. from Palos. It has several lights, none more than 5 leagues apart. San Antonio has a brilliant light *revolving* every half minute; 570 ft. above sea; visible 20 to 25 m. The Balearic Islands, Iviza and Formentera, Majorca and Minorca, lie to E. of San Antonio, from which Cape the **Formentera Light** bears about E.S.E. 22 leagues.

ISLANDS BETWEEN GIBRALTAR AND MALTA.

ALBORAN ISLAND, lat. $35^{\circ} 56\frac{1}{2}' E.$, lon. $3^{\circ} 1' W.$, is about $\frac{1}{2}$ m. in length, E. and W. It has a flattish top, above 60 ft. above sea, with steep cliffs of about 40 ft., visible in clear weather at 10 m. from a ship's deck. There is a 4 fathom shoal about 4 cables S. of the island. Alboran is nearly midway between Spain and Africa, and 37 leagues E.S.E. of Gibraltar. Vessels do not often go near it; but, bound either E. or W., they keep along the Spanish coast, making Cape de Gata their point of departure or land-fall. From the latter, Cape Palos bears about E.N.E. 30 leagues; and from Palos to Formentera the course is about E. by N. 42 leagues.

Formentera Island, has a *fixed* White light, elevated 518 ft.; visible 18 m.; at its S.E. point, Codolar, in lat. $38^{\circ} 38' N.$, lon. $1^{\circ} 37' E.$ Variation of compass, $17^{\circ} W.$

Cabrera Island, lat. $39^{\circ} 5' N.$, lon. $2^{\circ} 54' E.$, 22 leagues E. of Formentera, and 3 leagues to S. of Majorca, has a light *revolving* every half minute; 400 ft. above sea; visible 20 m. On Cape Salinas, the S. end of Majorca Island, 4 leagues to N.E. of Cabrera, there is a small *fixed* light.

Minorca has a light *revolving* every minute, elevated 170 ft. on Ayre islet, lat. $39^{\circ} 48' N.$, lon. $4^{\circ} 20' E.$, which is 4 m. to S.W. of the excellent harbour of Port Mahon.

SARDINIA ISLAND has now 4 lights to mark its S. coast. **San Pietro**, the W. island, has, at its W. point, a White light, *intermitting* every minute; elevated 440 ft.; visible about 30 m.; lat. $39^{\circ} 9' N.$, lon. $8^{\circ} 14' E.$ Port St. Pietro lies 2 leagues to N.E. of this light.

Cape Spartivento Light, lat. $38^{\circ} 53' N.$, lon. $8^{\circ} 53' E.$, on the S. extreme of Sardinia, is bright *fixed*; 265 ft. above sea; visible 23 m. This Cape is nearly in the meridian of Galita Island on which it is distant 27 leagues. Variation of compass, $14^{\circ} W.$

Cape Carbonara, the S.E. extreme of Sardinia, has a light-house on Cavoli Islet, lat. $39^{\circ} 5' N.$, lon. $9^{\circ} 32' E.$ The light is *intermitting* every half minute; 242 ft. above sea; visible 25 m.

Thus having described the lights and marks on the N. side of the new Mediterranean highway between England and India, we commence the description of those along the African coast.

AFRICAN COAST.—CEUTA TO TUNIS.

(VARIATION OF COMPASS AT CEUTA, $19^{\circ} W.$; AT ALGIER, $16^{\circ} W.$; AT TUNIS, $14^{\circ} W.$)

Ceuta is described at p. 10. Its *revolving* light is in lat. $35^{\circ} 54' N.$, lon. $5^{\circ} 17' W.$

The Riff Coast from Ceuta curves round to S., then S.E., and E., and lastly N.E., thus forming a deep bight to Cape Tres Forcas, which is 38 leagues and bears S.E. by E. from Ceuta. This coast is bold to approach, but wanting in harbours, and has only one *fixed* light at the Spanish port of Al-Khuzemas Bay, lat. $35^{\circ} 13' N.$, lon. $3^{\circ} 53' W.$, where scant shelter from W. winds may be found. The natives of this coast, formerly treacherous, and piratical, should not be too much trusted. Strangers should avoid landing.

Cape Tres Forcas, lat. $35^{\circ} 27' N.$, lon. $2^{\circ} 58' W.$, is a bold promontory with a watch-tower; from which Alboran island bears N. by E. $\frac{1}{2}$ E., distant 10 leagues; and Ceuta light-house bears N.W. by W. 38 leagues.

Melilla Light (*fixed*, visible 5 m.) about 3 leagues S. from the Cape, marks the fortress and small harbour of Melilla, a Spanish convict settlement. The roadstead affords good shelter from W. winds, a mile off the light, in 10 or 12 fathoms. Lat. $35^{\circ} 18' N.$, lon. $2^{\circ} 59' W.$

* See Admiralty Chart, No. 1186; Gibraltar to Alicante, and Spertel to Ferrat.

The Morocco coast from Melilla trends S.E. round by E. and to E.N.E., a deep bight to Cape Falcon. The Zafarin Islands, at 8 leagues S.E. by E. of Melilla, afford shelter from N. and N.W. winds, in 5 or 6 fathoms, to S. of the centre island; they are 2 m. off Cape del Agua, and lately became a Spanish possession.

The Coast of Algeria, which commences about 10 m. S.E. of these islands, like that of Morocco, has many lofty peaks. There are two or three lights between Melilla and Cape Falcon.

Raschgoun Island Light, 267 ft. above the sea, *flashes* every 10 seconds, alternately *Red* and *White*; visible 22 m. There is anchorage both to E. and W. of this little island.

The Habibas are two islands, with rocks between and around, lying 5 leagues to W. of Cape Falcon, and 2 leagues off shore. The S.W. island is nearly 400 ft. high; the other is low. **Plane Island**, 4 m. W. of Cape Falcon, is low; and **Vesta Rock**, with only 10 ft., lies 2 m. to N. of Plane Island, or 6 m. N.W. of Cape Falcon.

Cape Falcon Light, lat. $35^{\circ} 46' N.$, lon. $0^{\circ} 47' W.$, 840 ft. above sea, is *revolving* every 30 seconds, and then visible 25 m. There are two or three port-lights within 8 leagues to S.E. of it. Cape Falcon is 35 leagues E. $\frac{1}{2}$ S. from Cape Tres Forcas. The Needle Rock, off the lofty Cape Abuja, is 6 leagues to the E. of Cape Falcon; and Ferrat Cape extends about 2 leagues further E.

Arzew Bay, about $1\frac{1}{2}$ leagues to E. and S. of Cape Ferrat, has two *fixed* lights, nearly a mile apart. One on the Fort Point, elevated about 40 ft. The other on the Islet to the N., 66 ft. above sea, visible 10 m. Shipping resort to the bay for shelter from W. winds in winter and autumn, but it is exposed to E. and N.E. winds, which prevail from mid-May to mid-August. The anchorage has from 6 to 8 fathoms, sand; lat. $35^{\circ} 52' N.$, lon. $0^{\circ} 17' W.$

Cape Ivi, about 10 leagues E. by N. of Ferrat; has a light *flashing* every 4 seconds.

Cape Tenes Light-house, 30 leagues E. by N. from Cape Ferrat, exhibits a brilliant light, *revolving* once in a minute; elevated 290 ft.; visible 27 m. Lat. $36^{\circ} 33' N.$, lon. $1^{\circ} 21' E.$

Ashag Islet, a low black rock, $\frac{1}{2}$ a league off shore, lies 8 leagues E. of Tenes. Port Shershel, with a *fixed* light, is about 14 leagues to E. by S. of Cape Tenes.

Point Pescade Light, at the E. end of Cape Caxine, the broad and lofty headland (summit 1900 ft. high), which forms the W. side of Algier Bay, is *revolving*, every half minute; elevated 210 ft.; visible 25 m. Pescade or Caxine light is 27 leagues to E. of Cape Tenes.

ALGIER HARBOUR and CITY on the W. side of the Bay, are marked by three lights. One on Ile de la Marine, is *fixed*, on a white tower, 115 ft. above sea, and visible 15 m.; in lat. $36^{\circ} 47' N.$, lon. $3^{\circ} 4' E.$ *Red* and *Green* lights mark the N. and S. Mole-heads; the entrance of the harbour, nearly 400 yards wide. The sheltered area is $\frac{1}{2}$ m. long, by 3 or 4 cables broad. Ships should enter this, as the Bay of Algier affords no shelter from N. winds, whilst the new harbour gives perfect safety. The city is built to the W. of it, on the slope of the hill. Cape Matifou, 11 m. E. of Algier, has a *fixed* light, 240 ft. above sea. A rocky patch, with $4\frac{1}{2}$ fathoms, lies 2 m. N. of Matifou.

The coast to E. of Algier Bay goes about E. for 18 leagues to Cape Bengut, which has a *fixed* light. Thence about E.S.E. 20 leagues (with lofty peaks, 4,000 ft. high, within 7 m. of the sea) to **Cape Carbon**, on which is a light, *revolving* once a minute, when its brilliancy is visible 27 m. off, the lantern being 720 ft. above sea. To the S. of this lies the town of Bujeyah, with two lights; one *fixed*, visible 15 m., on Cape Bouac; the other *Red*, on Abd-el-Kader Point.

Bujeyah Bay affords shelter in Sidi Yaia Cove, from W. winds, and partially from N. winds, in 8 or 9 fathoms to the S. of Bouac Light. Strong winds and heavy seas occur in winter.

Cape Boojaroni, lat. $37^{\circ} 5' N.$, lon. $6^{\circ} 30' E.$, a projecting broad headland with seven capes, 23 leagues E. of Carbon, has a *fixed* light, elevated 560 ft., visible 30 m., Kolah and Storah Bays to the S.E. and E., have port-lights. Kolah Light is *Green*, flashing every 2 minutes.

Cape Ferro, 12 leagues E. by S. of Boojaroni and forming the E. point of Storah Bay, is a rocky neck of high land jutting out to N.N.W. On it is a *Revolving Light*, showing *Red* or *White* alternately every $\frac{1}{2}$ minute, 220 ft. above sea, visible 20 m.; lat. $37^{\circ} 5' N.$, lon. $7^{\circ} 12' E.$

Bonah. The coast from Cape Ferro trends S.E. by E., with several steep and rocky points, to **Rasel-Hamrah** or Cape de Garde, which has a light, *revolving* in 30 seconds, elevated 427 ft., visible 15 m. Bonah town has a *fixed* light, and *Red* and *Green* pier-head lights. **Cape Rosa**, 7 leagues to E. of Bonah, has also a *fixed* light, 418 ft. above sea; visible 12 m.

La Cala about 4 leagues E.S.E. of Rosa, is the E. town of French Algeria. It is a small port, only fit for steamers, but has a *Red* light on the E. side of its entrance, which is open to N.W. Lat. $36^{\circ} 54' N.$, lon. $8^{\circ} 28' E.$

THE TUNIS COAST. This N. extreme of Africa is rocky and irregular, with several sandy bays; but not lighted, like the coast of Algeria. **Cape Serrat**, 17 leagues E. of Cape Rosa, is 360 ft. high, and the land 3 leagues to S.W. is 1,500 ft. The Cape, lat. $37^{\circ} 15' N.$, lon. $9^{\circ} 14' E.$,

is bold and deep-to, but has rocks just to E. of the point; to the S. of them is a bay $\frac{1}{2}$ a league deep. The Fratelli, two rocky islets at $3\frac{1}{2}$ leagues to E. of Serrat, are 2 m. off shore.

Caution.—As there is no light on this Coast between those of La Cala and Cani Island, which are nearly 100 m. apart, vessels should in foggy weather pay attention to the deep-sea lead, which will indicate the position on the large-scale Admiralty charts.*

GALITA ISLAND, (centre) in lat. $37^{\circ} 31' N.$, lon. $8^{\circ} 56' E.$, is 7 leagues N.N.W. of Cape Serrat, 28 leagues to E. of Cape Ferro, and 19 leagues to W.N.W. of Cani Rocks Light. Galita is about 3 m. long E. and W., with three peaks, each above 1,000 ft. high. The roadstead is on S. side of the island, affording shelter from N. winds between N.W. and N.E., in 12 to 10 fathoms, sandy bottom. Aguglia and Galitona are two high rocks to W.S.W. of Galita Island, between which and them is a navigable passage, broader than 1 m., through which vessels coming from the W. may enter Galita roadstead.

Sorelli Rocks, in lat. $37^{\circ} 24' N.$, lon. $8^{\circ} 37' E.$, where H.M.S. *Avenger* was lost, are sunken rocks, having a 5-ft. patch, nearly one cable long, which lies 17 m. W. by S. of Galita; the other shoal, with not less than 4 fathoms, lies 2 m. further W.; they are steep-to. They lie 8 leagues off the African coast, between Cape Roux (a red steep conspicuous bluff) and Cape Negro, where the hills are 1,500 ft. high. Cape Rosa bears from them S.W. $\frac{1}{2}$ W. 32 m. To pass to N. of them, both Aguglia and Galitona must be seen to the right, or at the S. side of all Galita Island. When passing to S. of the Sorelli, the sugar-loaf peak at S.E. end of Galita must be seen to the right or S. of Aguglia.

Fratelli Rocky Islets are about 2 m. off African Coast, and 10 m. to E. of Cape Serrat. The W. one is 90 ft. high, the other 250 ft., forming good landmarks, and steep-to. Ras-al-Koran is 4 leagues to E. of them, and at 4 m. further E. stands **Ras Engelah**, the N. point of Africa, in lat. $37^{\circ} 21' N.$, long. $9^{\circ} 46' E.$, a low cape, with rocks off it; but, at 2 m. inland, stands Jebel Millerlah, 800 ft. high, and the hills on the W. side of Benzert Bay are as high.

Cape Il Guerra (Bianco,) the W. point of Benzert Bay, lies about E.S.E. and 3 leagues from Engelah, and the light-house on Cani Rocks bears from Guerra E. $\frac{1}{2}$ S. 12 m. Cape Zebih, the E. point of Benzert (Bizerta) Bay, is 10 m. to S.E. of Il Guerra, and 6 m. to S.W. of Cani Light.

Piana, a little low islet 2 m. to E. of Cape Farina, and 13 m. S.E. by E. from Zebih (Zibeed,) forms the N.W. point of the Gulf of Tunis. Piana Islet is in lat. $37^{\circ} 11' N.$, lon. $10^{\circ} 20' E.$ Cani Light bears from it N.N.W. $\frac{1}{2}$ W. 14 m.

CANI ROCKS LIGHT, in lat. $37^{\circ} 21' N.$, lon. $10^{\circ} 7' E.$, is a bright *fixed* light, 130 ft. above sea, visible 17 m.; the tower is white, circular, and 70 ft. high. The Cani or Kelb are two rocks above water, with rocks around them; but the light makes them no danger, and enables vessels to give a berth to Piana Islet; the soundings between them and all round the Cani will tell the distance off, if you have the large charts.*

Skerki Bank lies 40 m. to E.N.E. of Cani Rocks, and **Keith Reef** is 6 m. further to E.N.E. and sometimes breaks. With N.W. winds there is a S.S.E. current 2 or 3 m. per hour across Skerki Bank; with other winds, its set is uncertain.

Carthage Cape, 20 m. to S. of Cape Farina, has a light *revolving* every 20 seconds; elevated 480 ft. visible 26 m.

TUNIS PORT has a *fixed* Red light at Goletta, about 4 m. to S.W. of Cape Carthage. The anchorage in Tunis Bay is with the Red light about W.N.W., and Carthage revolving light N.N.E. in 6 or 7 fathoms mud. Cargoes are carried from the shipping by large lighters to Tunis. Vessels of light draught, paying port-dues, can enter the Goletta. Large ships may safely moor in Tunis Bay, which has good holding ground, though exposed to N.E. winds.

Zembra Island (summit 1,300 ft.,) in lat. $37^{\circ} 7' N.$, lon. $10^{\circ} 48' E.$, stands 8 leagues to E.S.E. of Cape Farina, and the same distance to E.N.E. of Carthage. Zembretta is an islet 3 m. to the E.S.E. of Zembra, and Cape Bon is 8 m. further to E.S.E.

Cape Bon, in lat. $37^{\circ} 5' N.$, lon. $11^{\circ} 3' E.$, the E. point of the Gulf of Tunis, bears from Cani light S.E. by E. $15\frac{1}{2}$ leagues; and is exactly midway between Cani and Pantellaria. Bon Cape has about the same elevation as Zembra Island, is bold and safe to approach. From it the coast runs to S. for 5 leagues to Kalibia, thence S.W. for 10 leagues to the Gulf of Hammamet. Tripoli is 92 leagues to the S. of Cape Bon.

PANTELLARIA is a lofty island, 15 leagues to S.E. by E. of Cape Bon, and 40 leagues from Malta. The summit is 2,700 ft. above sea, lat. $36^{\circ} 47' N.$, lon. $12^{\circ} 0' E.$ This island is 7 m. long N.N.W. and S.S.E., and a noble landmark. It is proposed to place a light-house on its N.E. side.

* See Admiralty Chart, No. 165; Sardinia to Malta, including Sicily.

Soundings and Currents. Around Pantellaria, the depths are between 300 and 400 fathoms; but, at 5 leagues N.N.E. of that island, the deep-sea lead will indicate the **Adventure Bank**, which is 10 leagues long, N. and S., and half as broad, between Marsala and Pantellaria. Large ships should avoid the Scourge Shoal (5 fathoms), which lies 8 leagues to N.N.E. of Pantellaria. Shoal spots of 8 and 14 fathoms have also been found on a bank midway between N.W. point of Sicily and Cape Bon (Africa).

Currents vary with winds in this narrow part of the Mediterranean. When in soundings, they may be ascertained by the deep-sea line, which should be used in thick or foggy weather, when land-marks are not visible. A fresh N. wind is sure to cause a strong current to S.S.E.; this causes vessels, bound to Malta from the W., to sight Gozo Island on the port bow, when expecting it on the starboard. Through the same cause, a vessel may steer from Cani Light to pass to the N. of Pantellaria, and find herself running on to that island.

Linosa Island, in lat. $35^{\circ} 52' N.$, lon. $12^{\circ} 53' E.$, is 500 ft. high, and visible at 20 m. from deck; bearing S.S.E. and 22 leagues from Pantellaria. It is in the latitude of Malta, which is 23 leagues off.

Lampedusa Island, belonging to Sicily, is 6 m. long W.N.W. and E.S.E. Cape Ponente, the W. extreme, is a steep cliff 380 ft. high, lat. $35^{\circ} 31' N.$, lon. $12^{\circ} 30' E.$ At Cavallo Bianco, the S. and E. end of the island, is a *fixed* light, marking the E. point of a small harbour. This light is $8\frac{1}{2}$ leagues to S.W. of Linosa Island. **Lampion** is a steep, rocky islet, like a wall, 140 ft. high; standing 8 m. to W.N.W. of Lampedusa, and in lat. $35^{\circ} 33' N.$, lon. $12^{\circ} 20' E.$

W. & S. COASTS OF THE ISLAND OF SICILY.

The **Ægæan Isles**, lying 7 leagues off the W. coast of Sicily, between Trapani and Marsala, are Maritimo, Favignana, Levanzo, and Formiche.

Maritime, the W. isle, is 4 m. in length N.W. and S.E., steep and rugged on its W. side. Libeche, the S.W. point, has a light-house just built, showing a *fixed* light which *flashes* every 4 minutes, elevated 240 ft., visible 20 m., lat. $37^{\circ} 57' N.$, lon. $12^{\circ} 4' E.$ With a N. wind you may expect a lee current here, setting to S.S.E.

Favignana, 3 leagues to E.S.E. of Maritimo, is 5 m. long N.W. and S.E., with a mountain in centre (1,000 ft. high) running across N. and S. Its W. end, Ferro Point, has a light *intermitting* every minute, 140 ft. above sea; visible 18 m. The E. end of the island has a *fixed* Green light. Levanzo light, *fixed*, is 6 m. to N.E. of Ferro Point. The E. Formiche rock has a *Red* light which is 5 m. to N.E. of Favignana *Green* light. A bank with 4 fathoms lies 1 league to S of Favignana.

MARSALA, the W. city of Sicily, has a light-house at the entrance of its port. The light is *fixed*, *flashing* every 3 minutes, elevated 55 ft., visible 12 m. It bears S.S.E. $\frac{1}{4} E.$, 4 leagues from Ferro Point Light, and is 6 leagues to N.N.W. of Cape Granitola.

Cape Granitola, the S.W. point of Sicily, is projecting and low, fringed with a reef, where many wrecks occurred before the light-house was built on Sorello Point, lat. $37^{\circ} 34' N.$, lon. $12^{\circ} 39' E.$ The light is *fixed* and bright; 120 ft. above sea, visible 17 m.

Scourge Shoal, in lat. $37^{\circ} 11' N.$, lon. $12^{\circ} 8' E.$, a patch with 5 and 7 fathoms on Adventure Bank, lies 33 m. to S.W. of Granitola; and 28 m. to N.N.E. of Pantellaria. (*See above.*)

Graham Shoal, in lat. $37^{\circ} 9' N.$, lon. $12^{\circ} 44' E.$, has only 2 fathoms, at 24 m. S. from Granitola; and 40 m. E.N.E. of Pantellaria. Vessels should therefore either pass near the latter, or keep within 3 or 4 leagues of the Sicily coast.

Monte Rosello Point, 40 m. S.E. by E. of Granitola Cape, has a White light, *flashing* Red every two minutes; 330 ft. above sea; visible 20 m. **Girgenti**, lat. $37^{\circ} 17' N.$, lon. $13^{\circ} 32' E.$, has a *fixed* Red light, 4 m. E.S.E. of Rosello. **Melville Shoal**, with $3\frac{1}{2}$ fathoms, lies 4 m. to S. of Girgenti Light. The coast from Rosello Point goes about S.E. for $8\frac{1}{2}$ leagues to Alicata Point; thence it forms a bight to Cape Scalambri, in which soundings are regular.

Scalambri Light, lat. $36^{\circ} 47' N.$, lon. $14^{\circ} 30' E.$, is nearly 20 leagues to S.E. of Rosello, and 15 leagues to N.N.E. of Gozo Island. It is a *fixed* White light; elevated 133 ft.; visible 18 m. Alga Grande Point is 3 leagues to S.E. of Scalambri, and thence the coast runs E.S.E. 7 leagues to the S. point of Sicily.

Corrientes Island, the S. extreme of Sicily, lat. $36^{\circ} 38\frac{1}{4}' N.$, lon. $15^{\circ} 5' E.$, has a *fixed* White light, 63 ft. above sea; visible 11 m. Cape Passaro is 4 m. to N.E. of this light.

Passaro Island has a White light, *flashing* Red every three minutes; elevated 130 ft.; visible 12 m. On the main land, at **Torre Mobile Slope**, $1\frac{1}{2}$ m. to W.S.W. of Passaro, is another light, *revolving* every two minutes; elevated 270 ft.; visible 18 m.; this is 18 leagues to N.E. of Valetta harbour. Vessels, bearing up from Malta Channel in W. gales, find shelter under Cape

Passaro, in 10 to 12 fathoms, soft, with Passaro Island light bearing about S., and the revolving light about S.W. Fishing-nets off the Cape must be avoided. Variation, 12° W.

THE MALTESE ISLANDS.

GOZO, the N.W. island, is 8 m. long, W.N.W., and E.S.E., and about half as broad. Its summits are nearly 1,000 ft. high, its cliffs very steep and rocky, with no good ports. Between it and Malta stands **Comino Island**; on both sides of which vessels can pass by keeping in mid-channel. Ball's Bank, about 1 m. long E. and W., with not less than 5 fathoms, lies 2 to 3 m. E.S.E. of Comino, and about 1 m. to E. of the N. point of Malta.

Gozo Light, in lat. $36^{\circ} 4' N.$, lon. $14^{\circ} 13' E.$, is White, *revolving* every minute; elevated 400 ft.; visible 24 m.; standing on Cape Giourdan, about $1\frac{1}{4}$ m. to E. of San Dimitri, the N.W. Cape of Gozo, from which Scalambri (Sicily) *fixed* light bears N.N.E. $\frac{1}{4}$ E. 15 leagues, and Cape Passaro *revolving* light is 19 leagues to N.E. by E. $\frac{1}{4}$ E. In clear weather, in Malta Channel, midway between Malta and Sicily, both revolving lights may be seen at once from aloft.

MALTA ISLAND is 15 m. long, N.W. and S.E., and half as broad. The harbours of Valetta are on its N.E. side. The surface of the island is uneven and lofty; its highest part, at 6 or 7 m. W. of Valetta, has an elevation of 800 ft.; the W. and S. coasts are steep cliffs, bold and deep-to. The N.E. and S.E. coasts have off-lying shoals.

VALETTA has two harbours, the Grand Port on its S. side, and Marsa Musceit on the N. The principal light-house stands on St. Elmo Castle, between the two harbours, and 6 leagues to S.E. of Gozo light. Fort Tigne stands at the N. side of the N. harbour; Fort Ricasoli at the S. side of the S. harbour; both of these points have lights, making entrance easy; but vessels must take anchorage subject to Port Rules.

The Grand Port is for men-of-war, with plenty of moorings laid down. The entrance is about 2 cables wide, between buoys which mark dangers on either side. Buoys are also placed for vessels to warp in during calms, or with foul winds, when they should not try to work in, as the entrance is very narrow. The Arsenal, Docks, and Naval Hospital are on the S. side of the Grand Port. There is good summer anchorage in Bighi Bay, about 2 cables to W.S.W. of Ricasoli light-tower; but in winter the N. winds bring in a heavy swell there. Ships can anchor off the S. side of Valetta town, between the Pratique Office and Floriana, with one anchor to the S. and a stern-fast to the shore.

Lights. St. Elmo Castle has a *fixed* light; 167 ft. above sea; visible 15 m., standing on the point, separating Marsa Musceit from Grand Port. Lat. $35^{\circ} 54' N.$, lon. $14^{\circ} 31' E.$

The N.W. angle of Ricasoli Fort has two *Red* lights placed vertically, 25 ft. apart; visible at 4 m. from sea, when bearing to the S. of about W.

Marsa Musceit, or Valetta N. Harbour is mostly for steamers and vessels doing quarantine. The deep channel-in is narrowed to little more than one cable's length. The Lazaretto is at the S. side of Manuel Island (Jezeira), and to S.W. of Fort Manuel. The best anchorage is above the Lazaretto, with a single anchor ahead and a stern-fast to the shore. The Pratique Office is on Valetta side, opposite Fort Manuel.

Lights. Tigne Point, the N. side of Marsa Musceit Harbour, has two *fixed* White lights, 25 ft. apart vertically; visible at 4 m. Up the harbour, the upper light (70 ft. high) alone is visible. The Dragut rock, with not less than 5 fathoms, lies $3\frac{1}{4}$ cables to E.N.E. of Tigne lights.

The E. coast of Malta trends from Ricasoli Fort to S.E. for about one league to the small Port of Marsa Scala, and thence about S.S.W., one league to Delamara Point, the E. side of Marsa Scirocco Bay; a safe harbour, except with S. winds; but these do not always blow home.

Marsa Scirocco Light, on Delamara Point, lat. $35^{\circ} 49' N.$, lon. $14^{\circ} 34' E.$, is *revolving* every half minute, alternately Red and White; elevated 150 ft.; visible 15 m. Coming from the N., you will not see the light till it bears to the W. of S.W. by S.

Coming from Egypt, you will sight this revolving light before the fixed light of St. Elmo. There is a bank of soundings extending to E. off the S.E. end of Malta, on which a ship's position may be told in foggy weather by the deep-sea lead when 10 leagues off. The shoalest part of this, called **Hurd Bank**, with less than 30 fathoms (least water 23 fathoms) lies from 3 to 4 leagues to the E. of Malta. But to W. and to N. of the Maltese islands no bottom can be obtained.

The S. and W. shores of Malta are rocky cliffs, deep-to, and without good anchorage. **Filfolà Rocky Islet** is in lat. $35^{\circ} 47' N.$, and lon. $14^{\circ} 25' E.$, about 2 m. off the S.W. coast, and $7\frac{1}{4}$ m. to the W. of Marsa Scirocco Light.

FROM MALTA (VARIATION ONE POINT) TO PORT SAID (VARIATION HALF A POINT).

Candia or Crete Island, though in the line which mail-steamers take between Brindisi and Alexandria, is seldom sighted by those between Malta and Port Said. The island has no light-houses on the S. side, but there are several islets there. **Port Lutro**, the ancient Phœnice, in lat. $35^{\circ} 10' N.$, lon. $24^{\circ} 4' E.$, is the only bay on the S. shore of Crete which is secure in winter, as the S. winds never blow *home* against the lofty wall of mountains which rise above it, and the sea rolls in merely a *dead swell*. It is the harbour of **Sphakia**, 1 league to E. of Lutro, and the capital town of a district; and 20 m. to N. of Gavdo Island.

Gavdo Island, the ancient Claudia, in lat. $34^{\circ} 49' N.$, lon. $24^{\circ} 5' E.$, lies about 7 or 8 leagues off the S.W. side of Crete, is 1000 ft. high, and is 47 leagues from Dernah on African coast.

The Crete mountains are lofty, rising to 8000 ft., both to N. and to E.N.E. of Gavdo, and to 4000 ft. within 2 leagues of the S.W. end of Crete, near Elaphonisi and Kavo Krio, in lat. $35^{\circ} 16' N.$, lon. $23^{\circ} 30' E.$ The S. hills of Crete (to E. of Gavdo) are more than 8000 ft. high; its E. peak, at one league from the sea, is over 2000 ft. The islet Kupho Nisi (200 ft. high) off the S.E. end of Crete, is in lat. $34^{\circ} 56' N.$, lon. $26^{\circ} 10' E.$

A *fixed* light is proposed for Paleo Kastro (E. end of Crete) lat. $35^{\circ} 12' N.$, lon. $26^{\circ} 19' E.$

THE COASTS OF TUNIS AND TRIPOLI, though affording harbours for small craft, need not be approached by steamers between England and the Red Sea. Tripoli City lies about 22 leagues S.W. by S. from the E. end of Malta island. From the bottom of the Gulf of Sidra, which is 120 leagues to E.S.E. of Tripoli, the coast bends for about 80 leagues to the N. and N.E., (past Ben Ghazi and the ancient Ptolemais) to Ras Sem, the N. point of the Dernah district, nearly 2000 ft. high, from which part of Africa the W. end of Candia Island is distant 51 leagues.

Ras Sem, or Cape Razat, lat. $32^{\circ} 56' N.$, lon. $21^{\circ} 39' E.$, the E. extreme of Sidra great Gulf, bears S.E. $\frac{1}{4}$ E. 180 leagues from Valetta. **Ras-al-Hilil**, 8 leagues E. of Ras Sem, is the projecting Cape of Africa between Malta and the mouths of Nile. A course S.E. by E. from Valetta will put a vessel about a dozen miles off this Dernah coast, which is rocky, with mountains inland, and need not be approached within a league. A *fixed* light is proposed for Dernah town, lat. $32^{\circ} 45' N.$, lon. $22^{\circ} 40' E.$ From Ras-et Tyn, a Cape 25 leagues E.S.E. from Ras Sem, the coast bends to the S. and S.E., forming Bombah Gulf. **Marsa Tebruk**, lat. $32^{\circ} 3' N.$, lon. $24^{\circ} 4' E.$, (the E. port of Tripoli) bears S.E. 19 leagues from Ras-Et-Tyn.

THE COAST OF EGYPT from Marsa Tebruk trends E.S.E. for about 20 leagues to Arab's Gulf. To the E. of Solloom Bay, are the rocky ledges of Taifa, Ishailah, and Medina; the first about 2 m. off shore; the others nearer. Vessels should keep outside them, although coasters can go inside. The coast is barren, though moderately elevated.

Arab's Tower, marking the E. end of Arab's Gulf, is conspicuous, on a high part of the coast, between two dark hills, 6 leagues to W. of Alexandria; it is the common land-mark for vessels approaching that city from the W., and may be seen generally within 18 m. Shoals lie nearly 2 leagues off shore to N.W. and to W. of the tower.

ALEXANDRIA is 400 m. E.S.E. of Ras-al-Hilil, and 800 m. from Malta Harbour. Soundings are a guide in approaching Alexandria; for to the W. the water is deep and clear, whilst to N.E. it is shallow and muddy. There are here two Ports, the Old and the New, separated by a neck of land on which stands the old Pharos, a square castle, distant $1\frac{1}{4}$ m. on a N.E. by E. bearing from the new Light-house on Eunostos Point. The Old Port is to S. and S.E. of this; the New Port is a nearly circular basin to N.E. of the city.

The landing place of the Cairo Railway Terminus is in the Old Port, 1 m. to S.E. of the light-house, and a long half mile to the S. of the P. and O. Company's moorings. The Custom House is not half a mile to N.E. of those moorings, and to N. of it there is a basin within which is the Arsenal; further W., and halfway towards the light-house, stands the Palace. Protection is afforded to the harbour by shoal water extending to S.W. from the light-house point for half a mile to the Abubakar rock. From this rock a breakwater is being constructed, which is intended to stretch for 1 m. to S.S.W. across the shoal called the Harbour Bank; thus more effectually sheltering the anchorage off the City of Alexandria.

Channels. There are three channels, the Marabut, the Central, and the Corvette Pass, all leading into the Old Port.

Marabut Pass, the W. one, with 22 ft. depth, is 4 m. W. of the city, and needs a Pilot.

The Central Boghas Pass, is 2 m. to W.S.W. of the light-house. The shoals are marked by 2 beacons, N.E. and S.W. of each other, and the course is between them. El Kot, the N.E. beacon, (a white sphere on a pole) stands 2 m. S.W. by W. of the light-house. The other, El

Fara, (a red triangle on a pole) is $3\frac{1}{2}$ cables further to S.W. In the fair channel of the Central Pass there is not less than 25 ft. at low water.

Directions. Approaching Alexandria from the W., keep the light-house to the S. of E. until abreast of the Pass. Steer for El Kot, about E.S.E. on with Buheireh (a similar beacon on shore), till El Fara beacon bears S.S.W., in line with another similar beacon on the hills, and a Buoy (horizontally striped green and white), bearing S.S.E., is on with the Pasha's Kiosk which stands to N.E. of a lot of windmills. Haul up S.S.E. with these last marks on. When within 2 or 3 cable-lengths of the buoy, you can haul to S.E. and then E. Pass to S. of a Red buoy which marks the S. end of Harbour Bank, then haul up to N.E. towards the city.

The Corvette Pass is nearest to the light-house, very narrow, with only 19 ft., and the new breakwater will render it of little use. Probably a new channel will be formed there.

Light. Alexandria or Eunostos light is White, *revolving* every 20 seconds; elevated 180 ft.; visible 20 m. Lat. $31^{\circ} 12' N.$, lon. $29^{\circ} 52' E.$ The building is of red brick.

ABUKIR BAY has its E. point marked by Rosetta light-house, 30 m. to N.E. of that of Alexandria. Abukir or Nelson's Island stands just halfway between the two, and the old Castle of Abukir is on the point $2\frac{1}{4}$ m. to S.W. of it, or 13 m. N.E. by E. from Alexandria. The Bay to the S. of Nelson Island is full of shoals. Culloden Reef is 1 m. to E.N.E. of the island.

Mouths of the Nile. The coast of the Nile delta is very low and the sea bed is shallow. Recently three iron pile light-houses have been set up; at Rosetta, Brulos, and Damietta.

ROSETTA LIGHT, in lat. $31^{\circ} 30' N.$, and lon. $30^{\circ} 20' E.$, is *revolving*; every 10 seconds alternately Red and White. Situated 30 m. from Alexandria, at the N.E. extreme of Abukir Bay, visible 20 m., elevated 175 ft. The lantern is Black, and the tripod of the structure is White.

BRULOS LIGHT, in lat. $31^{\circ} 36' N.$, and lon. $31^{\circ} 10' E.$, is *fixed*, and visible 20 m., being elevated 176 ft. The lantern is painted Red; the centre column Red; the E. column is White, and the W. one is Black. This light is on the prominent point between Rosetta and Damietta; distant from the former 43 m., E. $\frac{1}{4}$ N. by compass.

DAMIETTA LIGHT, in lat. $31^{\circ} 32' N.$, and lon. $31^{\circ} 52' E.$, is *revolving*, once every minute; height 176 ft.; visible 20 m.; distant from Brulos 37 m. E. by S. The lantern is painted White, and the columns in Black and White bands.

Damietta Shoals, with only 3 fathoms, lie 12 m. W. by N. from this light. Currents on this low, shallow coast are uncertain; and, after W. winds, they sometimes run 2 m. an hour, with indraught into the bight. Do not approach the shore nearer than 7 or 8 m.

PORT SAID HIGH LIGHT, in lat. $31^{\circ} 15\frac{1}{4}' N.$, and lon. $32^{\circ} 19\frac{1}{4}' E.$, is *flashing*, every three seconds. The light-house stands at the shore end of the W. breakwater. It is a grey-coloured octagonal-shaped concrete tower, 180 ft. high, exhibiting an electric light visible 25 m., and forming a noble beacon by day or night.

PORT SAID, though affording good anchorage for small vessels, cannot be considered a harbour, either in extent or depth, for vessels of great tonnage or draught. It is formed by two breakwaters, enclosing some 450 acres, with an average depth of 13 or 14 ft. The Ship-channel, leading to inner basins, has a depth of 25 to 28 ft. Port Said has daily steam-boat communication with Ismailia, 41 m. journey. Drinking water is forced to the town by steam power from Ismailia, whence there is a fresh-water canal to the Nile at Cairo.

The W. Breakwater extends about 2300 yards from shore, with the High Light-house near its base, and a low Red light at its extremity. The East one is only 2000 yards long, with a low Green light at its point. Vessels should steer in, about S.W., and so pass between the Red and Green. The Channel is marked by two floating Red lights on the West, and two White lights on the East side. The inner basins have an area of 137 acres, with a depth of 27 ft. Throughout the Canal all beacons and buoys are White on the East side, and Red on the West side.

The outer anchorage is in 6 fathoms, with the Red lights and the High Light-house in line. The bottom is mud, good holding ground. Take care to avoid the East Bank, (recently formed, with 12 ft., least water, about $1\frac{1}{4}$ m. E. of the Red pier-light), by keeping the High Light well open, or to Right of the Green light. Pilot-boats carry a blue-peter flag.

WINDS. S.W. gales are heaviest on this coast; but, coming off the shore, produce no sea. N.N.W. and N.W. are prevailing winter winds, but are not often heavy, and between the breakwaters protection is found. Summer winds are N.E.; right into Port Said; though seldom strong, they frequently cause sea enough to hinder dredging in the Canal's mouth. November is the quietest month. In February, a strong N.E. wind sometimes blows, lasting only a few hours. In March a hot S. wind (Khamisin) blows for 2 to 4 days. W. and S.W. winter winds bring rain.

With regard to Winds, the Hydrographer of the Admiralty says, "the greatest difficulty to

be experienced will be not from the tides, but from the prevailing N.E. wind in the Canal, which will make close steerage difficult in going from north to south." "A moderate wind *astern*, causing a ship to yaw a $\frac{1}{2}$ point off her course, would probably place her on shore before she had time to recover her steerage." The narrowness of the canal is a great drawback.

TIDES & CURRENTS. With W. winds, the current runs East past the Port Said mouth of the Canal. Sometimes after E. winds, it has a short West set. The waters of Lake Timsah are stated to be continually running at a slow rate into the Mediterranean, sometimes from $\frac{1}{2}$ to 1 m. per hour. But the banks show that the N. part of the Canal is subject to a rise and fall of one foot. The southern portion of the Canal between Suez and the Great Bitter Lake, feels tidal influence from the Red Sea; a regular flow for about 7 hours, and an ebb for 5 hours. In the Little Bitter Lake, about 2 m. to N.E. of Persepolitain Monument, the current runs *across* the course of the Canal, and **careful steering** is necessary. At the Suez entrance, the rise of tide at springs, unless affected by strong winds, is between 5 and 6 ft.; from Suez, about 6 m. towards the Little Bitter Lake, it is under 2 ft.; whilst in the Great Bitter no rise is perceptible. In a hot summer, evaporation may, however, produce a slight indraught into this broad expanse of water. The tidal stream between Suez and Chalouf turns to N. about two hours before high water at Suez, and runs for 7 hours. It commences to run S. one hour before low water at Suez, and continues $5\frac{1}{2}$ hours. At F. and C. of moon, the tidal stream runs N. from 9 h. 30 m. to 4 h. 30 m.; and moves S. from 4 h. 30 m. to 10 h. It has been recommended to navigate this S. portion of the Canal with an opposing tide.

Making the Port. Steam ships can easily make Port Said. The coast is very low, but the masts of shipping in the inner basins and the High Light-house are conspicuous. Navigators have only to bring the latter on a S. W. bearing and steer in till the small lights and breakwaters come into view. Large ships are recommended not to enter at night, except with a pilot or under favourable circumstances. A small vessel may easily enter, as her draught permits of anchoring between the breakwaters. **Prudence** forbids any vessel running for the Port in a gale blowing on shore. In moderate weather, sailing vessels may, with a fair wind, enter the inner basin: but with W. winds, care must be taken lest they be set to leeward, or on to the East Bank. With contrary winds steam tugs are necessary. If a sailing vessel be towed through the Canal to Suez during June, July, and part of August, there is nothing to hinder an excellent passage with N.W. winds through the Red Sea to Aden, and onwards with the S.W. monsoon to Bombay.

THE SHIP CANAL. The whole length from Port Said to the Red Sea at Suez is 87 nautical miles; about 65 of narrow canal, and 22 through the lakes. Its width at surface is 325 ft., but the central deep passage is less than 100 ft. broad. **Caution** in navigating is therefore needed, especially when passing other ships. The maximum speed should never, except in the Great Bitter Lake, exceed 5 m. an hour. All vessels should be steered from the bridge, the pilot being by the helmsman. The speed should be reduced when approaching or passing a vessel. There is a small *fixed* Light on the W. bank about 1 m. S.W. by S. of the High Light-house.

Sand-drift. The first 24 m. of the Canal are through a wet, sandy plain, which, with a "high Nile" is overflowed. In this part there is no sand-drift. But the neighbourhood of Kantara has severe drifts in high winds; so have the 12 m. between Lakes Ballah and Timsah, and the 7 m. between the latter and the Great Bitter Lake. Lastly, the space between Little Bitter Lake and Suez is subject to sand-drift, sometime thick as ordinary fog, and most distressing to the eyes.

Sidings. There are sidings (*gare*) every 5 or 6 m. between Port Said and Lake Timsah, in which vessels bring up to let another pass, or to moor for the night. The first siding on the E. bank is at Kantara, $24\frac{1}{2}$ m. from Port Said; this is 1300 ft. in length, by the side of terra firma; all the previous ones are on the W. bank by the side of Lake Menzaleh. These sidings are marked by posts driven into the banks, and are merely extensions of the floor of the Canal under water. The Kantara *gare* can accommodate three large vessels. There is a telegraph station at each of these sidings, with a nautical official to regulate the movements of passing vessels in concert with the authorities at Port Said, Ismailia or Suez. The best stopping places for ships after nightfall, and during sand-drifts, or high winds, when there is risk of grounding, are the Kantara *gare*, Lake Timsah, and Great Bitter Lake. There are two sidings on the W. bank between Ballah Lake and Ismailia; and one between Suez and Little Bitter Lake. Telegraph wires are established throughout the length of the Canal. On the shores of Lake Timsah, two *Red* lights are placed. One at Ismailia, used by vessels going N. The S. light is for ships on the S. voyage entering the Lake from the N. They also indicate the anchorage in Lake Timsah.

Curves are the chief difficulties for a long ship. The first is close to Port Said, and being moderate, presents little difficulty in passing round. Thence there is a straight run of 27 m. to

Lake Ballah, between which and El Guisr, a distance of a dozen miles, there occur two slight and one moderate curves. Between El Guisr and Ismailia there is a sharp curve, recently improved. The Canal takes a curve through Lake Timsah, where the course is altered from S.W. to S.E. in less than a mile's run. The deep-water channel is marked out by conspicuous iron beacons. A long ship experiences some difficulty in entering the Canal from Lake Timsah on the N. voyage. By Toussoom there is a slight curve, and from thence a straight run between iron beacons marking each side of the deep channel, into Great Bitter Lake, where the **N. Light-house** is placed, distant $54\frac{1}{2}$ m. from Port Said. This marks the margin of deep water in the Great Lake, and is about 2 m. from land. It is a *red* iron pillar light-house, 40 ft. high, exhibiting a *fixed* white light, visible 10 m. The water in this lake is 2 or 3 ft. deeper than in the Canal, and vessels can anchor where they like. A straight course by compass, S.S.E. $\frac{1}{2}$ E. for 8 m., takes a ship through the Great Lake, to the **S. Light-house**, which is similar to the N. one. Here the deep channel is to W. of the light-house, between it and a buoy.

From the S. light-house, through Little Bitter Lake, is a distance of 10 m. to Guerin Station, where embanked Canal again commences; the deep channel is marked by conspicuous iron beacons on both sides. In this length of 10 m. there are two curves; the first is abreast of Persepolitan Monument, where the channel is marked by beacons.

Careful steering is here necessary, as the tidal current from Suez runs across the course of the Ship-Channel, and in practice it is found more difficult to keep in the centre while passing through beacons than between embankments. The other curve is rather sharp near the South end of Little Bitter Lake, and caution is needed as tidal influence is felt here. By the village of Chalouf, the Canal is narrower than elsewhere, but its banks are thrown up higher, some 40 ft. The channel is straight till you pass the 84th m. from Port Said by the old quarantine station about $1\frac{1}{2}$ m. E. of Suez town. Here (the last curve) the tidal stream affects a vessel's course, and it is best to navigate between Suez and Chalouf with an opposing tide.

GENERAL DIRECTIONS. By the regulations of the Canal Company, all vessels are required to have a head and stern anchor ready for letting go; also hawsers for warps. All vessels, measuring over 100 tons, are bound to take a Pilot. The deepest water is throughout in the centre of the Canal. **Careful steering** is needed, rather than pilotage, to keep the ship exactly in the centre. The Commander will in this matter know perhaps better than the Pilot how the vessel behaves. In the broad portions, especially in the S. part of Little Bitter Lake, where tides are felt, the navigation demands great care.

Mooring bollards, one cable's length apart, are fixed in the banks; they will bear sufficient strain to cant the largest ship. In the event of getting hard aground, the best shore-anchor is found to be a spar buried horizontally on the further side of the bank with perpendicular planks in front; the hawser being led through a cutting in the bank.

In passing round a curve in the Canal, the bow of the vessel should be kept as near as possible to the inner or convex side; and, previous to rounding, the engines of a steamer should be stopped, to pass the curve at slowest speed. Great speed causes injury to the banks.

The only serious damage, to which vessels are liable, is from the propeller coming in contact with the bank. Therefore any vessel should proceed at slow speed, and large ships may find advantage in using the Company's tug-boats rather than their own screws. Large vessels using their own screws, will find an advantage in having also a tug-boat astern; which, in case of grounding, is the best place for the tug to be in.

When the wind blows across the Canal, care must be taken to prevent the ship drifting to leeward. All unavailable top-gear, that may hold wind, should be sent down. It is better to stop and secure to the bollards, rather than to risk damaging the screw by using it near the lee bank.

At the mouth of Suez Creek, allowance must be made for the strong tidal stream which sets across the Canal, and frequently in a direction contrary to the current in the Canal.

All Beacons and Buoys are *White* on East side, and *Red* on West side of the Channel.

THE COMPANY'S RULES FOR SUEZ CANAL.

Art. 1. That the navigation of the Suez Canal be opened to all vessels without distinction of nationality, provided they do not draw more than seven mètres fifty centimètres (7 m. 50 c.), equal to 24 ft. 7 in. English; the Canal being eight mètres (8 m.) in depth, equal to 26½ ft. English; Steam vessels will be allowed to navigate through the Canal, using their own propellers; sailing vessels above fifty tons will have to be towed with the service established by the Company. Steamers requiring to be towed can enter into a mutual agreement with the Company. Towed vessels will have to provide their own hawsers.

Art. 2. The maximum speed for vessels in the Canal is provisionally fixed at ten kilomètres (10 kil.), equal to 5.4 English knots the hour.

Art. 3. Each vessel measuring more than one hundred (100) tons will have to take a Company's pilot whilst passing through the Canal, who will furnish instructions as to the course to steer, the captain remaining responsible for the conduct and management of his vessel.

Art. 4. When a vessel wants to pass through the Canal, and has anchored at Port Said or Suez, the captain must have her inscribed at the Transit Office, and pay the Canal dues, as well as pilotage, towage, and charge for mooring when necessary. A receipt will be given, which he can use when required. He will have to furnish the following particulars:—Name and nationality of vessel, name of captain, name of owners and charterers, port from which she has come, port of destination, number of passengers and size of the vessel according to the legal measurement constituted by the official act of the government to which she belongs.

Art. 5. In order to form the trains of towed vessels, the captain will be furnished with a ticket numbered, using his receipt of the charges as a way-bill, and, after having received the pilot on board, will place his vessel in the position assigned to her.

Art. 6. Vessels entering the Canal will have to brace and peak yards. There ought to be two anchors, one placed at the head of the vessel and the other at the stern, and ready to let go so as to bring up at the first order of the pilot.

Art. 7. 1st. Each vessel will require a boat in tow, with a warp all ready to run ashore in case of need to one of the mooring posts attached to the banks of the Canal. 2nd. The Captain must also have watchmen kept on board the vessel during the day the same as at night. These men will be ready to cast off or cut the ropes at the first order. 3rd. During the navigation in the night vessels must keep their lights burning regularly, and a man forward on the look-out. 4th. All steam-vessels, tugs or others, must whistle when passing the curves at the approach of vessels which they have to pass or cross; also at the approach of dredges or any other objects they may meet in their passage. 5th. Vessels meeting in opposite directions must slacken speed, each standing close to the starboard bank, or stop, according to the advice of the pilot. 6th. When a vessel wishes to pass another going in the same direction, the captain must signal his intention to the other. The slowest vessel must stand close to the starboard bank, and lessen her speed as much as possible.

Art. 8. 1st. Vessels which for any cause whatsoever may have to stop in the Canal, must place themselves as near the windward shore as it is possible, and moor at both ends. 2nd. In case of necessary stoppage, and when a proper mooring-station cannot be reached (which the captain always should try for), he must have immediately signals placed by day, and lights by night fore and aft of the vessel. 3rd. In case of a vessel grounding, the Company's agents have the right to prescribe the means for getting her afloat, or discharging the cargo if necessary, all at the cost of the person in fault, to be determined by the cause of the accident.

Art. 9. 1st. Captains are not allowed to moor in the Canal except in cases of urgent necessity, and with the advice of the pilot. 2nd. To throw any ballast, cinders, or rubbish, or anything else whatsoever into the Canal. 3rd. In case of anything whatsoever falling into the Canal, a declaration of the same must be immediately made to the pilot, who will forward it to the agent at the nearest station. 4th. It is prohibited to captains to search for any objects that may fall into the Canal, without the authority of the Company's agents. 5th. The salvage, whatever way it may be effected, of any objects which may have fallen into the Canal, is always done at the expense of the captain, to whom the recovered articles are returned on repayment of the expenses incurred.

Art. 10. Captains have to agree, before entering the Canal, to obey all instructions contained in the copy of the present rules, and to further their execution.

Art. 11. The tolls for the right of transit are calculated on the measurement tonnage of the ship, as likewise the charges for towing and berthing. This tonnage is determined (until fresh orders) by the official papers on board. The toll for passage from one sea to the other is 10 f. per

ton measurement, and 10 f. each passenger, payable on entering either at Port Said or Suez. The charge for towage is fixed at 2 f. per ton. The charge for berthing or anchoring either at Port Said, Ismailia, or opposite the embankment near Suez (after a stay of 24 hours, and limited to 20 days at utmost) is 5 centimes per ton per day, at place assigned by Harbour Master.

Pilotage is charged according to draught of water, as follows:—

	For each decimètre in draught.
Up to 3 mètres (9 ft. 10 in. English)	5 francs.
From 3 mètres (9 ft. 10 in. English) to 4.50 mètres (14 ft. 9 in. English) 10 ..	"
From 4.50 mètres (14 ft. 9 in. English) to 6 mètres (19 ft. 9 in. English) 15 ..	"
From 6 mètres (19 ft. 9 in. English) to 7.50 mètres (24 ft. 7 in. English) 20 ..	"

Each decimètre (4 in. English) in draught pays proportionally to the category to which the vessel belongs. The pilot kept on board, in case of berthing, will have to be paid 20 f. per day.

Vessels towed will be allowed a reduction of 25 per cent. off the charge for pilotage.

(VARIATION OF COMPASS AT PORT SAID, AT SUEZ, AND JUBAL STRAIT, $5\frac{1}{2}^{\circ}$ W.)

THE SUEZ ENTRANCE is easy of access. A breakwater on the E. shore off Gad-el-Marakeb protects the Canal from S. winds. An extensive basin, with depths of 23 and 26 ft., will admit the mail-steamers alongside a wharf to which the railway comes from Suez. The S.E. side of this basin has a narrow wharf, the wall of which forms the W. side of the ship-canal.

LIGHTS. The west side of the Canal's mouth is marked by a *Red* light, and the point of Gad-el-Marakeb breakwater has a *Green* light. Outside of these marks the channel is indicated by *White* buoys on the East, and *Red* to the West.

The **Light-vessel** is situated 1 m. S.S.W. of the breakwater, and 3 m. S. by W. of Suez town. It has a *fixed* light, visible 6 m. Lat. $29^{\circ} 55' N.$, and lon. $32^{\circ} 33' E.$ About 3 cables E.S.E. from this light a *Red* buoy marks the N.W. side of some rocks, lying a mile off Gad-el-Marakeb Point. The beacon on Kal-ah-Kebireh shoal stands rather more than 1 m. to the W.; and there are mooring-buoys in 5 fathoms, about 6 or 7 cables to N. by W. of this light-vessel. All ships must pass W. of it. Large ships approach on a N. by E. bearing, or with the W. minaret of Suez in line with the light-vessel, which course takes them through the Narrows, leading them clear to W. of the Newport Rock. Small vessels can run in N.N.E., over Ataka Flat, which has depths of 23 and 24 ft.

SUEZ TOWN, in lat. $29^{\circ} 58' N.$, lon. $32^{\circ} 33' E.$, is becoming of great importance. It is a British consulate, and the terminus of the Egyptian railway. Agents for several English and French companies reside here. The Peninsular and Oriental Company have offices, and there is an electric telegraph to London. Of hotels, we may mention Wood's (late Shepherd's), and that of the Peninsular and Oriental Company. These are the best buildings, the native houses have a wretched appearance. The population is about 8000. There are two or three Mosques in the town; a French hospital at its W. end, and further W. there are three cemeteries,—Mahomedan, Latin and Greek. The English cemetery is on an island, N. of the town, with Suez Creek intervening. The Khedive's house is W. of the last and N. of the town; and beyond it, to N.W. $\frac{1}{2}$ m., is the Indian-Transport Hospital. Suez Creek now opens into the Maritime Canal. The Egyptian Government works, in connection with railway, canal and docks, are very extensive. There is a railway now between Suez and Ismailia, and steam-boat communication between Ismailia and Port Said daily.

A dry dock, about 420 ft. long, with 78 ft. width of entrance, and a depth over the sill of 22 ft., has been constructed at Suez; in this H. M.'s Frigate *Forte*, and *Jumna*, Indian transport, have been docked. Port Ibrahim, the commercial basin at the Suez mouth of the Canal, will soon be ready; then basin and dock accommodation will be very complete. A freshwater canal from the Nile at Cairo to Ismailia was completed in 1862, and sends off branches to Port Said and Suez. Thus a supply of fresh water is found at both ends of the Maritime Canal.

Dangers in Suez Bay. This space—comprised between the mountains of Ataka, in Egypt, Suez town on the N., and Ras Mesalle on the shore of Arabia Felix—has several reefs, the half of which have only recently been discovered.

Mesalle Shoal, the outer danger—from which the light-vessel is $6\frac{1}{2}$ m. off, and scarcely visible—is a coral rock with only 4 fathoms, bearing W.S.W. from Ras Mesalle $2\frac{1}{2}$ m. It is amongst soundings of 9 and 10 fathoms, with 20 fathoms only $\frac{1}{2}$ m. to W. Other shoals exist between it and the Arabian shore, and in the bight towards Gad-el-Marakeb. This shore is very low, whereas Egypt is lofty, and has no dangers, except within 4 m. of Suez.

Newport Rock, a patch with only 13 ft., now buoyed, lies in the middle of Suez Bay, and 1½ m. due S. of the light-vessel. Other shoals exist to S.E. of this; and off the Egyptian shore the flat of Atáka has 3½ and 3¾ fathoms towards Newport Rock. Ships of great draught must adopt the central channel, called the "Narrows," close to W. of that rock; the leading mark through is the W. minaret of Suez on with light-vessel, or bearing N. by E.

Gad-el-Marakeb Shoals extend 1½ m. S.E. from Suez light-vessel, and are marked by two or three buoys, which point out the margin of foul ground. **Kal-ah-Kebireh**, having a beacon, is a reef lying 1 m. W. of the light-vessel, and 2 m. S.W. from the commercial basin.

These are all the reefs of which the mariner need be warned. But there are several within a mile of the Egyptian shore, in Adabieh Bay and under the mountains of Atáka. The N. shoals, called Etuleh, bear W. 3½ m. from the entrance of the Canal; the intervening space, except within a mile of Etuleh, has regular but shoal soundings with muddy bottom.

TIDES. It is high water at Suez on F. and C. at 11 h. Ordinary springs rise 6 ft., but sometimes with S. winds to 8 ft. Neaps 4 ft. Tidal influence extends up the Canal as far as Little Bitter Lake, where the rise is less than 1 ft.

The GULF of SUEZ, which extends for 170 miles to its junction with the Red Sea at the island of Shadwan, is nowhere less than 6 m. wide and mostly over 10 m. With good lights at Suez, Zafarana, and Ashrafi, the navigation is easy for a steamer; but to a sailing vessel, rather difficult; the bed of the Gulf being deep, so that the deep-sea lead must be used, and so flat that soundings are little guide, except here and there. Arab pilots are obtainable at Suez, who are excellent judges of distance, both by day and night, and may be trusted in the navigation of the Gulf of Suez. Difficulty is felt at night by a stranger in judging his distance from shore, owing to the high land lying so far back from the actual low coast-line, and the peculiar haze that frequently prevails.

EGYPTIAN SHORE. The Atáka mountains, S.W. of Suez, are a lofty plateau, 1700 or 1800 feet above the sea; with detached peaks of less elevation on their S.E. or sea face, whilst the plains of Mohaggiara occupy the low strip of sea-board less than 1 m. in breadth, extending some 7 m. S.W. from Ras Atáka. Beyond this, for a dozen miles further S.W., the coast is also low abreast of Wadi Mousa, or the Valley of Moses. **Jebel Tarateer**—three remarkable sugar-loaf peaks, standing close together on a hill about 200 ft. high, at ¼ m. from the beach and 13 m. S.W. of Suez—forms an useful landmark. **Ras Abooderáj**, 35 m. S. of Suez light-vessel, is a cape, off which coral reefs extend about 1½ m.; thus, with the reefs off Metameh on the Arab coast, narrowing the channel to less than 8 m. A bay, a dozen miles deep, is formed between Capes Atáka and Abooderáj. The high land of the latter skirts the S. half of this bay.

Zafarana Light—on the cape of that name, 50 m. S. of Suez—is 83 ft. high, a *fixed* light, visible 14 m. The soundings off it are 15 fathoms at 3 m. and 30 fathoms beyond 5 m. The coast at the back of the light has some lofty peaks, but the shore-line recedes a few miles S. of it, afterwards taking a general straight direction for 60 m., or nearly to Ras Zeitee.

Leaving Suez light-vessel (see Newport Rock), ships drawing not more than 3 fathoms may steer S. by W. for about 8 m.; then, with **Jebel Tarateer** W. about 5 m. off, a course S. by E. for 40 m. takes her down the Gulf and abreast of Zafarana light-house. Keep on same course a few miles; then S.S.E. from the light, parallel with Egyptian shore.

Mount Akrab, said to be 10,000 ft. high, of a precipitous, conical form, stands up, a noble landmark, above a lofty range situated 17 m. from the sea. In fine weather, it is said to be visible nearly 100 m. by day, and one third of that distance by night.

Zeitee high land, a ridge, about a dozen miles long, skirting the Egyptian shore, and from 1000 to 1500 ft. high, is an useful mark. **Ras Zeitee** near its N. extreme, the most prominent part, is bold and deep-to, having 30 or 40 fathoms close to the rocky shore. This cape stands a dozen miles S. of Toor middle shoal. From the S. end of Zeitee land to Shadwan island, the coast is fronted by numerous islands and reefs; but these Straits of Jubal are well marked by the high land and the admirable *revolving* light.

JUBAL STRAIT LIGHT, on the N.E. part of Ashrafi reef, in lat. 27° 47½' N., and lon. 33° 42½' E., is a White light of the first order, *revolving* once a minute. Elevated 125 ft. above the sea, it is visible in clear weather 17 m. The light-house is of open iron work, with the keeper's dwelling near the base.

Ashrafi or Ushrufi Islands consist of three long narrow strips of land on a coral basis, and separated by a deep navigable channel from the reef on which the light-house stands.

Jubal Island, is of round form, with a central peak 420 ft. high. It is 10 m. S.E. by S. from the light. The E. side is deep-to, with 30 fathoms within a mile, and much deeper water further off. Two or three reefs intervene between Jubal and Shadwan. **Abou Nahas**, the reef on which the "*Carnatic*" was lost, stands out nearly 2½ m. from the N. point of Shadwan.

Shadwan Island stands sentinel at S. entrance of Jubal Strait, being midway between Egyptian and Arabian shores. The culminating point at its S. end is 700 ft. above the sea-level; its sides are precipitous and deep-to on E. and S. Soundings are not obtainable by passing ships; the depth at 3 m. off its E. end is upwards of 400 fathoms. Ras Mohamed stands 18 m. to N.E. The fair channel between Shadwan and Shab Mahmoud reefs is a dozen miles broad. The S.E. point of Shadwan is in lat. $27^{\circ} 28' N.$, lon. $34^{\circ} 2' E.$

Toor Middle Shoal lies in the centre of the Gulf, abreast of Toor. The shoalest water is a patch of 3 fathoms at its S. end, bearing W.S.W. from Toor, and from Zafarana light S.S.E. $\frac{1}{4}$ E., 71 m. The shoal extends about 8 m. N.W. of the patch, with soundings of 7, 12, and 9 fathoms. Between it and Jehan Peak there is another shoal with 7 and 8 fathoms. Casts of the lead may therefore, in dark nights, warn a vessel running down the Gulf, if she be near the Arabian shore.

A steamer, running down S.S.E., when 40 m. below Zafarana Light, may sight the lofty Mount Akrah, bearing about S.S.W.; or Great Jehan Peak, on the Arab coast, about E., and 12 m. off. She then may keep away S.S.E. $\frac{1}{4}$ E. till the high land of Zeitee appears ahead. When 66 m. from Zafarana, she will be between Toor Shoal and Mount Akrah, and her position may be known by the bearing of Cape Zeitee, which stands up a dozen miles S. from the shoal. The body of Zeitee high land should then bear from S. to S.S.E.

The Arabian or Sinai Coast for nearly 50 m. below Suez is an extensive sandy plain at the foot of a high mountain range, and so it is in the Straits of Jubal. But intermediately there are two bold and lofty headlands; Hummum-el-Faroun, at 52 m. from Suez, and Jehan Cape, which bears 47 m. S.E. $\frac{1}{4}$ S. from Zafarana light. The coast is fringed with dangerous coral reefs, extending sometimes more than 7 m. off shore; these are apparent in the day-time, from the water changing its colour from deep blue to bright green.

Hummum Bluff is a steep cliff about 1500 ft. high, nearly overhanging the beach. At its foot there are a hot, salt spring, and two hot caverns, called Hummum-el-Faroun. This bluff is nearly abreast of Zafarana light, from which it is 18 m. distant. The reefs of Gad Mallap extend nearly 9 m. W.N.W. from Hummum Cliff, and reduce the breadth of the navigable sea to less than 10 m.: but below Zafarana light it is more than 20 m.

Great Jehan Peak, the N. and highest of two pointed hills, stands near the sea, 26 m. N.W. from Toor, and 100 m. below Suez. **Dangerous reefs** called Shab Khoswan, extend 5 m. W.N.W. from Jehan Peak and along shore to Ras Sherateeb; thus making this part of the Arab coast prominent and dangerous, and the channel not a dozen miles broad. But the Peak is an excellent mark. Jehan Cape bears by compass N.E. 32° m. from Mount Akrah on the opposite shore.

TOOR HARBOUR is 26 m. S.E. from Jehan Cape. Toor reef, $1\frac{1}{4}$ m. in length N. and S., and having patches of 6 and 10 ft. on it, lies off the harbour, about $\frac{1}{4}$ m. from the shore. When the sun shines, this shoal looks green and is easily avoided; the pilot being aloft. Mount Sinai stands 26 m. N.E. by E. from Toor Cape, but the western verge of the mountain range hides it from the view at sea. (See Toor, in Section Third.)

Shab Riyah is a reef that shelters the anchorage of Sheik Riyah about 6 m. below Toor. Off this place about 5 m., there are two shoals with 4 or 5 fathoms on them; their W. extreme lies a dozen miles S. of Toor Cape. **Shab Jarah** are some reefs that extend 3 m. off shore between Shabs Riyah and Ali.

Shab Ali Reefs extend 8 m. off Sinai coast. They are from 25 to 30 m. below Toor, and opposite to Ashrafi Light; reducing the Channel to less than 7 m. Their S. patch bears E. by S. 8 m. from the Light. These reefs are deep-to, the lead therefore gives little warning; but they are visible from aloft, as the colour of the water changes from deep blue to bright green.

Shab Mahmoud, a long reef, lying 7 m. W. of Ras Mohamed (the S. Cape of Sinai), has at its S. point a beacon rock, about 4 ft. above H. W., this is more than 20 m. E.S.E. of Ashrafi Light. Between Shab Mahmoud and Shadwan Island, the Channel is 12 m. broad.

Ras Mohamed, the S. point of Sinai, in lat. $27^{\circ} 43' N.$ and lon. $34^{\circ} 16' E.$, is a flat topped piece of land about 90 ft. high, with abrupt, broken white cliffs; nearly insulated, only connected with the main by a sand-neck. A conspicuous black hillock, about 150 ft. high, stands about $2\frac{1}{4}$ m. N.W. of it. This Cape is abrupt, and so deep-to on its E. side, that 400 fathoms is found at 2 m. off. On its W. side the reefs are many and deep-to; the space between them and Shab Mahmoud, though shoal enough for anchorage, has sunken rocks.

NAVIGATION OF THE STRAIT OF JUBAL. Coming southward (as above, see page 28), when the extremes of Zeitee high land bear from S. to S.S.E., a vessel is abreast of Toor shoal, and may steer S.E. $\frac{1}{4}$ S. to pass Jubal Strait light 2 m. off, and onwards past Jubal and Shadwan islands; all excellent land-marks; bearings of which enable the navigator to fix his position on the

Admiralty Chart with great exactness. A run of 25 m. on a S.E. course from Ashrafi revolving light, will put the vessel off the E. end of Shadwan with the Peak W.S.W. 2 or 3 m. off; and this is her starting point for the passage down the Red Sea.

Passage down the Red Sea. The course is S.S.E. from the above position off Shadwan, and the distance 84 m. to the **Light-house** on the **Brothers Island** (now building). These are two small coral islets, standing up about 60 ft. out of the sea, and so deep-to, that no anchorage can be had. Soundings of 600 fathoms were obtained 10 m. N.E. of them. They are situated 32 m. E.N.E. of Cosire on the Egyptian coast, and in lat. $26^{\circ} 17' N.$, lon. $34^{\circ} 49' E.$

Light on Dædalus Shoal. This small reef, whose proper name is Abdul Kheesan, lies in the centre of the Red Sea, in lat. $24^{\circ} 55\frac{1}{2}' N.$, and lon. $35^{\circ} 52' E.$ It exhibits a *fixed* light, at 61 ft. above sea-level, visible 14 m. The light-house is of open iron-work, painted Red, and hoists the Turkish flag. Dædalus shoal bears from the Brothers, S.E. by S. distant 98 m.

Examination of Compasses.—Too much attention cannot be paid in iron steamers to this important subject. Scarcely a day passes without the navigator being able to get Amplitudes at the sun's rising and setting. Thus may the total deviation from the true course be frequently ascertained. A ship's error in position, due to the compasses, is often attributed to lateral currents.

ST. JOHN'S ISLAND, or ZEBERJED is in lat. $23^{\circ} 37' N.$ and lon. $36^{\circ} 10' E.$, bearing S. by E. (*true*), 81 m. from Dædalus shoal. It is a small, barren island, without vegetation or water, whose central hill is about 700 ft. high, and visible in fine weather about 27 m. It is steep on all sides, and no soundings are obtainable around. A small, steep, rocky islet stands 3 m. to S.E.

Although Dædalus shoal has a good light, we recommend navigators to sight St. John's, and take a fresh departure therefrom.

Bound to Jiddah Port, after passing close to Dædalus light, a steamer should steer S. by E. for 80 m. This puts her 7 or 8 m. to E. of St. John's; whence a course S.E. $\frac{1}{2}$ S. and distance 186 m., will place her about 24 m. W. of Jiddah anchorage, and a dozen miles S. of the Eliza shoals. Her Arab pilot will then take her in, of course only by day; and speed should have been so regulated as to arrive by day-light. The S. extreme of Eliza shoals, **Shab-ul-Kebeer**, is in lat. $21^{\circ} 37' N.$, lon. $38^{\circ} 51' E.$ (*See Jiddah*, in Section Third.)

Dædalus towards Jebel Teer. After leaving the Dædalus, she will, on a clear day, sight the lofty mountain Jebel Wadi Lehuma in the S.W.; and, when 30 m. off St. John's, the high part of Cape Benass, with the distant mountains of Berenice in the background.

From St. John's, Jebel Teer island bears S.E. by S., 576 m. distant. A run of three days at 8 knots an hour. No soundings are obtainable, and during the two middle days no land is visible. About 50 m. below St. John's, she will (by day) sight the lofty Elba mountains in the S.W. When 100 m. from St. John's, she will be off Cape Elba, giving its reefs a wide berth of more than 20 m. When 180 m. below St. John's, she will be midway between Jiddah (Arabian coast) and Ras Roway (Nubian coast).

Reefs.—About two-thirds of the way from St. John's to Jebel Teer, or between the 17th and 19th parallels, some dangerous reefs and low islets lie many miles off both coasts. Those of the Abyssinian coast—called Mussarmroo—are between lats. 18° and $19^{\circ} N.$ Those of the Arabian coast—called Wussaleat—project between lats. 17° and $18^{\circ} N.$ A direct course from Dædalus shoal to Jebel Teer places a ship unpleasantly close to those reefs off Arabia. We recommend, therefore, three courses to carry her in mid-channel from St. John's down the sea. Firstly, S.S.E. $\frac{1}{2}$ E. for 200 m. Secondly, S.S.E. for a like distance. Lastly, S.E. by S. for about 180 m. to Jebel Teer. Thus will she give a wide berth of 30 m. to Mussarmroo and Wussaleat, and to Dithahayer or Farasan reefs also, which are off the Arab coast and less than 90 m. from Jebel Teer.

Jebel Teer, in lat. $15^{\circ} 32\frac{1}{2}' N.$, and lon. $41^{\circ} 50' E.$, is a volcanic island, of circular form, elevated 900 ft., and visible at 40 m. from the masthead in clear weather. Smoke by day, and sometimes flame by night, may be seen to rise from it. No soundings are obtainable near it. The nearest land is Kotama Island, bearing from the Jebel E. by N. $\frac{1}{2}$ N. 26 m. distant.

Ships generally pass to West of Jebel Teer, and of Zebayer islands, which are 36 m. further, also volcanic, and about 600 ft. high. The course continued, viz., S.E. by S., leads past the latter, and to the eastward of Aboo Eyle islets, which lie 4 or 5 m. off the N.E. side of Jebel Zooghur, and may be passed within a mile.

Aboo Eyle. These islets are 103 m. from Jebel Teer. It is usual to pass about 1 m. E. of them, but practised navigators have passed between them and Jebel Zooghur. From Aboo Eyle, steer S. by E., and 52 m.'s run will put the vessel about 7 m. off Mocha; thence the course is about S.S.E., and the distance 40 m. to Perim Island.

Jebel Zooghur, the highest island in the Red Sea, and nearly 10 m. in length from N. to S., has its centre in lat. 14° N. Several lofty barren hills with sharp peaks, formerly volcanoes, form its high land. The W. peak is highest, more than 1000 ft. There is anchorage to S. of it, during N. winds, in 7 to 9 fathoms, sandy bottom, inside of Sandy Peak islet, the passage between which and Zooghur has 7 fathoms. Anchorage in 7 or 10 fathoms, with smooth water in strong S. winds, may be found to N.W. of the highest peak, on the N. side of the prominent rocky W. Cape of Jebel Zooghur, in lat. $14^{\circ} 2'$ N. Here the S. wind blows in gusts from the island, but the water is smooth. There is no protection on the Arabian coast opposite Zooghur, except at Hodeidah, and that place is 40 m. further N. (See Section Third.)

Mocha, a walled town about $\frac{1}{2}$ m. square, lies on the sandy shore of Arabia S.S.E. 51 m. from Abou Eyle. It has several mosques and large buildings white-washed. The Grand Mosque is the best mark and central object of the town. Fresh provisions are obtainable and native bread. The water is brackish and dear. Hodeidah has supplanted Mocha as a place of trade.

Soundings. In passing Mocha, the lead should be always used to determine the distance off shore; if the hand-lead gets bottom, haul out a little. There is said to be a shoal (which the surveyors could not find) between Bab-el-Mandeb and Zee Hill; therefore never go under 12 fathoms in this part unless you have an Arab pilot.

PERIM ISLAND stands sentinel at the entrance of the Red Sea. There are fair channels on both E. and W. sides, which are called respectively the Small and Large straits. The island is bare and rocky, about 4 m. long by $2\frac{1}{2}$ broad, rising in centre to 210 ft., and with rather steep cliffs all round. A sand-bank* extends $\frac{1}{2}$ m. off the N. side; but the E., S., and W. sides are approachable close-to. On its S.W. side there is a good harbour; easy of access and egress for steamers; the entrance $\frac{1}{2}$ m. wide, has deep water; inside, the depths are 8, 7, 6 and 4 fathoms. Sailing vessels have difficulty in getting out with S. winds, as the current then runs N.

PERIM LIGHT, in lat. $12^{\circ} 40\frac{1}{2}'$ N., and lon. $43^{\circ} 23'$ E., is a white light of the first order, revolving once in every minute elevated 240 ft., and its brilliant points are visible 22 m. in clear weather. The light-house is placed 1100 yards within the N.E. bluff.

The **Small Strait** is nearly $1\frac{1}{2}$ m. wide, with 10 or 12 fathoms in mid-channel in its N. part; 14 to 16 in centre, and 11 to 13 fathoms between Pilot rock and S.E. end of Perim.

The **Large Strait** is 9 m. broad, bounded on the W. by Ras Sejern (Abyssinian coast), and the Brothers, which stand E. of Sejern and S. of Perim. Throughout no soundings are obtainable, except with deep-sea lead near Perim. Either Strait may be used. Under steam alone, we prefer the Small one as a short cut; but in the Large Strait there is less chance of the wind dropping, when a vessel is running through with sail set to a fair wind.

The **Brothers** are six small islands, of volcanic nature; the N. one is largest and highest, being 350 ft. above the sea. They are all deep-to, and have deep channels between them, but the water is shoaler, 15 to 10 fathoms, between the W. Brother and Ras Sejern.

BAB-EL-MANDEB CAPE is the S.W. extremity of Arabia. Its highland consists of two groups of hills, of which the S.W. appears like an island from a distance; it comes close down to the sea, and has off it a little islet about 50 ft. high, called Fisherman's or Pilot rock, separated by about a cable's length from the main. Jebel Manhali, the highest peak (865 ft.), is sharp, and a capital landmark, visible on a clear day 35 m. The N.E. range of hills, Jebel Heykah, is not so lofty. Between the two groups the shore is a low, sandy, and barren plain; on the Red Sea side of which, N. of Jebel Manhali, the French have settled a small piece of territory, called **Sheik Syed**, embracing an inlet of the sea, which affords shelter to boats.

Ras Arrar, the S. Cape of Arabia, lat. $12^{\circ} 36'$ N., lon. $43^{\circ} 55'$ E., is a low rounded point of sand, 11 leagues to E. of Perim light, difficult to distinguish at night, and is dangerous from its prominence and the shoal water off it, being in the direct line of steamers between Red Sea and Aden. The high land of Jebel Kharaz, or St. Antony, (2770 ft. high) stands a dozen miles to N.E. of the S. danger off Ras Arrar, which should never be approached within 4 m., or into 15 fathoms by day and 20 by night, as the water shoals suddenly. In the day-time the edge of the reef is discernible from aloft. From a safe position off Cape Arrar a direct course for the S. point of Aden may be made. Variation of compass between Perim and Aden, nearly 4° W.

Marahig Light will not be seen when bearing to S. of E. by N., as it then hides behind the S. extreme of Aden high land. In the months of June, July, and August, between Aden and the Straits, thick hazy weather is often experienced; the deep-sea lead will then be a good guide to keep the vessel between 2 and 3 leagues off the Arabian Coast, in 25 to 40 fathoms. On approaching Aden from the Red Sea, the high peninsula land of Jebel Hasan (called little Aden), rising to

* The ship *Esora* in 1871, grounded off the N.W. point of Perim.

1200 ft. in centre, might at first view be mistaken for that of Aden, being a similar promontory, but the loftier summit of Jebel Shamshan (1770 ft.), the crowning peak of Aden, will soon point out that place. When within 12 m. of Marshig Light, do not let it disappear till the Light-vessel bears to the N. of N.E., then steer for the latter into Aden Back Bay.

ADEN HARBOUR, or Back Bay, Bunder Tuwayi, is very small and shallow, affording insufficient accommodation for the rapidly increasing merchant fleet trading between the Mediterranean and Indian Seas. The P. and O. Company and the Messageries Maritimes have moorings laid down, and for R. N. vessels there are others. The entrance which has only 18 ft. at L. W. is to N. of the Outer Red buoy, which is placed 2 cables to N.E. by E. from the Light-vessel. Vessels of much draught must therefore anchor outside the Light-ship and communicate with the Harbour Master who will take them in towards high water. There are large stores of coal at Aden; vessels usually anchor off the coal sheds between the saluting pier on Ras Jarbein and the islet called Flint Rock. Water (condensed) may be purchased at 13s. per ton, near the French Co.'s Coal Depot.

LIGHTS. Ras Marshig, the S.E. Cape of Aden, has a *fixed* light, elevated 245 ft., visible 20 m. in clear weather: lat. $12^{\circ} 45' N.$, lon. $45^{\circ} 3' E.$; this cannot be seen when bearing to southward of E. by N.; because the S. Cape of Aden is higher and more projecting.

The **Light-vessel** is painted Red, with a Red ball at masthead, and hoists a Red flag by day. It shows a *fixed* White light, 38 ft. above sea, visible 7 m., firing a gun and burning a blue-light as a vessel enters. It is moored in 18 ft. (L. W.) at 2 cables N.W. of the battery on Steamer Point, (Ras Marbut). Lat. $12^{\circ} 47' N.$, lon. $44^{\circ} 58' E.$

Tides. The tidal streams of the Bay are irregular, being influenced by the currents outside; the flood sets gently E. into the Inner harbour; the ebb sets to W. at the anchorage. It is H. W. at F. and C., between 9 h. and 10 h.; spring tides rise 7 to 8 ft.

Directions. The coast round Cape Aden is bold and deep-to. The approach from the Red Sea direction has been described. Vessels, coming from the E., have now the advantage of Marshig Light; after passing which and rounding Ras Tarshein (on which is the new S. fort) about 3 cables off, they may steer for the Light-vessel, passing to W. and to N. of it, then E. to the anchorage. It is better always to moor (under the direction of the Harbour Master), the anchorage being confined; and with good scope of cable, on account of sand-squalls which, after sultry weather, come from N. and E., giving little warning.

A ground swell at times rolls into Aden Back Bay during the period of the Indian S.W. monsoon; but then the Front or E. Bay has a smooth, good anchorage in 7 or 8 fathoms, in Hokat Bay, to N. of Marshig light, and about $\frac{1}{2}$ m. to S.E. of Aden town. There are not yet, at this Front Bay, conveniences for coaling and watering; but, if wishing merely to communicate with the Authorities, and to save time, this anchorage may be found handy from June to August; whereas the town of Aden lies a hot 4 m. land journey from the Back Bay anchorage.

Between October and May, the wind is from the E. in Gulf of Aden outside Perim Straits, and from about S.S.E. in the S. part of Red Sea. During the remaining months, June to September inclusive, the wind is N.W. in Red Sea, and W. in Aden Gulf.

The Gulf of Aden and Entrance of Red Sea are further described in Section Third.

Mediterranean Currents. In settled weather, when the great Atlantic stream runs into this sea, current moves strongly to E. along African coast to Cape Boujaroni, which throws it off to N. of Galita Island; then across the Bay of Tunis, along S. coast of Sicily, past Malta and towards mouths of Nile; augmented, especially in summer, by that river, it curves round to N. along Syrian coast, then to N.W. between Cyprus and Gulf of Scanderoon, and to W. along Karamania coast.

When the water is falling, the tidal stream is running E.; thus on ebb tide, the E. current is strongest along African and Spanish coasts. Strong ripples, like breakers, are often seen near islands where counter-currents meet; these are found in several bays of African coast; for Tangier and Ceuta, see page 12 (*Eddies and Counter-currents*). Salient points—as Tres Forcas and Boojaroni—throw off the E. current and cause a counter-current on their lee, running back to the W. close along shore. Thus a W. current is usually found passing Rashgoun and Zafarin islands, whilst at the Habibas the E. current is strong. Algier Bay has generally an along-shore current to the W. The same is observed in Bouja Bay; and at Kolah and Storah Bays, caused by Cape Boojaroni (off which the E. current has great force) deflecting that E. current to the N., and towards Sardinia. A part of this turns back by Galita and Sorelle to S.W. and to W.; passing La Cala as a W. current; and so round and out of Bonah Bay to N.; then setting W. again towards Cape Ferro. E. and N.E. winds greatly affect, and for a time change these African currents.

Between Tunis and Sicily, shoal water forms a barrier between the E. and W. deep basins of Mediterranean, over which a N. wind or a S.E. gale makes the sea overflow from one basin to the other. In long-settled weather, current sets to E. between Galita and Sardinia, over the Skerkis

and Adventure Bank, and to S.E. along the S. shore of Sicily, at from $\frac{1}{4}$ m. to 1 m. per hour. In Malta channel the S.E. current is at times very strong. On the contrary, when S.E. winds prevail between Malta and Tunis, the waters are swept to N., past Pantellaria (*see* page 19) over Adventure Bank, and between Maritimo and the Skerkis; to the N. of Maritimo, this current chimes in with the general E. set from between Galita and Sardinia, and runs northward (during the S. wind) towards Italy and Gulf of Genoa.

On S.W. coast of Sicily, that strange, sudden rise of sea, **The Marobia**, occurs generally after a W. wind, during a calm, but predictive of a S.E. gale. It is most felt at Mazzara, and is probably occasioned by a W. wind through Skerki Channel blowing towards Sicily, whilst a S.E. gale is coming up between Malta and Tripoli. Thus, when the air is still, with a lurid sky, suddenly the water rises 2 ft. above usual level and rushes rapidly into creeks, receding as rapidly after few minutes; these phenomena generally continue from a $\frac{1}{4}$ hour to 2 hours, succeeded by a S. breeze, which quickly strengthens with heavy gusts.

Winds and Weather. The Mediterranean atmosphere, for a great part of the year, is beautifully clear. Winds from N and W. predominate in autumn and winter; S.E. and S.W. winds in spring. At equinoxes, the wind seldom changes without bringing rain or rain-clouds; and the mariner has generally warning of bad weather. On Spanish coast, the S. wind seldom blows except in winter, when S.W. gales send in heavy seas between Malaga and Cartagena. Along these shores a dense mist precurses an E. wind. Off Majorca and Minorca, E. winds are frequent in June till August; and N.N.W. to N.N.E. winds are violent in winter. Strong S. winds occur in winter on S. coast of Sardinia, where N.E. winds are squally with rain. E. winds, especially the S.E., are loaded with vapour. On the coast of Sicily, in summer, the sky is clear and serene. After September, the winds become boisterous and the air dense; dews and fogs increase and rain falls. Malta has violent N.E. gales (*Gregale*) in winter. The S.W. wind at Valetta in summer is hot; sultry nights in August and September are very trying. The Scirocco or S.E. wind, though hot near African deserts, is not very unpleasant at Malta, though intolerable on N. coast of Sicily.

On N. coast of Africa, *Northers* are dangerous winds in winter at Algier. Clear atmosphere precedes or accompanies W. winds. Heavy clouds, brought by E. winds, obscure the summits of African mountains, and sometimes the peaks of Galita Island and Pantellaria. Much dew at night, when the wind has been E., indicates an E. wind for next day. If the air is dry, a W. wind may be expected. At Galita, S. winds are rare in summer, E. winds then mostly prevail; rains and storms are brought by W. winds. S. winds seldom happen in winter, when N. winds blow fresh, causing a heavy sea. Fogs are common in winter, and the navigator must remember that this N. part of Africa and the dangerous Sorelle Rocks have **no lights**. The coasts of Tripoli and Egypt have mild winters, and summer heats are moderated by sea breezes. Thick fogs are common in Gulf of Sidra. Winds are pretty constant from N. during summer, veering to E. at close of September; at end of the year, they blow hard from N.W. and W. When March begins, S. winds may be expected, backing to E. in May, and then to N. for the summer.

Winds. Gibraltar Strait, *see* page 11—Port Said, *see* page 22—Red Sea, *see* Section Third.

SECTION II.

ENGLAND TO THE CAPE OF GOOD HOPE.

CHAPTER III.

ENGLAND TO THE EQUATOR.

COAST OF FRANCE—SPAIN—PORTUGAL—LIGHT-HOUSES—PLACES OF SHELTER—MADEIRA—CANARIES—
CAPE VERDE ISLANDS—TRADE WINDS—EQUATORIAL CALMS.

(VARIATION AT MADEIRA AND CANARIES, 21° W.; AT CAPE VERDE ISLANDS, 19° W.)

In these days when excellent Admiralty Charts are within reach of all, and Sailing Directions for different Oceans are multiplied, an East India Directory may well avoid discussion of the *best* Routes from England to the Cape of Good Hope at all seasons; especially as it would (were justice done to such an important subject) much swell the volume, and leave less room for information concerning the Navigation of Eastern Seas.

In the First Section (pp. 1 and 13) we have given a brief description of the passage from England to Gibraltar; and here we extend it towards Madeira and St. Helena, describing previously some ports along the French and Spanish coasts, to which necessity might drive a disabled ship.

The Wind and Current Charts exhibit at a glance most of the information which a mariner needs to help him to make choice of the best route at any time of the year.

LIZARD POINT, from which departure may be taken, is in lat. $49^{\circ} 58'$ N., lon. $5^{\circ} 12'$ W.

When clear of the Channel, if the wind continue fair, steer to pass to westward of Cape Finisterre, at 20, 40, or 50 leagues' distance. If the wind prevail at W. or W.S.W., pass round the Cape as near as prudence admits, then stand to the S., and do not lose time by endeavouring to pass it at a great distance; for the wind may become more favourable in proceeding S., and in winter it is a great advantage to get out of the cold weather as soon as possible.

If the French coast, at the entrance of the Channel, happen to be approached, it is proper to observe, that **Ushant Light**, in lat. $48^{\circ} 28'$ N., and lon. $5^{\circ} 8'$ W., is *revolving*, showing alternately a *White* face twice, and then a *Red* one at intervals of 20 seconds, and 223 ft. above H. W., on the N.W. point of the island, visible in clear weather 24 m. The soundings near Ushant are 60 to 65 fathoms. H. W. about $4\frac{1}{2}$ h. on F. and C. of moon. Variation, 23° W. (*See* also p. 14).

In the Bay of Biscay, and to W. of Ushant, the current sets to the W. at times in winter; but in summer it generally sets N.E. and E. It is often found to set E. from March to November, particularly when W. winds prevail. Off Cape Finisterre, and near the S. part of the Bay, it sets mostly along the coast to the E. Caution is therefore requisite with a W. wind, in standing southward, to weather Cape Finisterre; for with a ship's position not correctly ascertained, it would be imprudent in cloudy weather to stand to the S. in the night, if not certain of being well to the W. of the Cape.

Gales from W.N.W. sometimes blow into Bay of Biscay, continuing for several days, and some outward-bound East-India ships have been driven far into the Bay during these gales in April and May. If a ship lose any of her masts, the heavy sea rolling in from N.W. and W.N.W. with an E. current, would force her to leeward; and should the gale continue long and severe, she might be drifted on a lee-shore. We may therefore give a brief description of places in Bay of Biscay which are sheltered from gales at N.W. or W.N.W.

Belle-Ile and **Basque Road** afford the best shelter for large ships in westerly gales.

BELLE-ILE is about 10 m. long from N.W. to S.E., and 5 m. broad, lying between the parallels of $47^{\circ} 24'$ and $47^{\circ} 16' N.$; being high, it may be seen at a great distance. The N.W. end is rocky, and the Birvideaux Bank is nearly midway between it and Ile Groix. A ship approaching the island with the wind at N.W. or W.N.W., should steer along the S. side at 2 m.'s distance, to Point du Canon, the S.E. extremity; and when abreast of this point, haul up for Point Kerdonis, called in some of our charts Point Loc-maria, which is the E. point of the island, distant about 2 m. from the former, anchoring under it in 8, 10, or 15 fathoms, where she will be sheltered from N.W. and W. winds. If the wind should veer to S.W., she may run to the northward of the point, and anchor on the N.E. side of the island.

Light. There is a *revolving* light near the S.W. part of Belle-Ile, 276 ft. above H. W., in lat. $47^{\circ} 18' 43'' N.$, and lon. $3^{\circ} 13\frac{1}{4}' W.$ Time of revolution 1 minute; visible 8 leagues.

Ile Hoëdic, about 7 m. E. of Belle-Ile, is the termination of the rocky range which stretches S.E. from the peninsula of Quiberon. Near the E. point of the island there is a small *fixed* light, 85 ft. above H. W., which may be seen, in clear weather, about 3 leagues. Off the S.E. end of the island lies a cluster of rocks, called the Cardinals: the largest is distant from Hoëdic about a mile, and is always above water. If a ship be driven to the E. of Belle-Ile, she may pass a mile to the S. of the Cardinals, then haul up to the N., and anchor on the E. side of them and Ile Hoëdic, in 9 or 10 fathoms, sand and mud.

BASQUE ROAD extends from Lavardin Shoal to Ile d'Aix, having from 10 fathoms water close to the shoal, to 12 and 13 fathoms in the middle of the road; and from 5 to 9 fathoms about $1\frac{1}{4}$ m. to the N. and N.W. of Ile d'Aix, a flat island, with some houses on it, situated about half-way between Oleron and the main-land. The soundings in mid-channel, between Oleron island and Ile de Ré, are from 12 to 15 fathoms, shoaling on each side toward the banks. The Channel, called Pertuis d'Antioche, leading to Basque Road, is 2 leagues wide. It is best to keep nearer to Ile de Ré than to Oleron, on account of the Antioches' rocky banks, which lie $\frac{1}{4}$ a league off the N. end of the latter. Lavardin Shoal is a small rocky bank, dry at low-water spring tides, about $1\frac{1}{4}$ m. off the S.E. end of Ile de Ré.

Lights. The N.W. extremity of Oleron has a light-house, called Chassiron, showing a *fixed* light, 164 ft. above H. W., in lat. $46^{\circ} 3' N.$, and lon. $1^{\circ} 25' W.$; visible 6 leagues. If there be much sea in Basque Road, a ship may run up along the W. side of Ile d'Aix, taking care to keep nearer to it than to Oleron, to avoid the bank off the latter; and then anchor in 5 or 6 fathoms, off the S.W. end of Ile d'Aix, in the inner road. There is a small *fixed* light on the fort near the S. point of Ile d'Aix, visible 3 leagues.

Ile de Ré (a dozen miles to N. of Chassiron) has a light-house, called Baleines, on its N.W. end, in lat. $46^{\circ} 15' N.$, lon. $1^{\circ} 34' W.$; the light is 166 ft. above H. W., and *revolves* every 30 seconds; visible 7 leagues.

Roche Bonne Light-vessel, in lat. $46^{\circ} 12' N.$, lon. $2^{\circ} 22' W.$, about 15 leagues to N.W. of Oleron Island, is moored on the E. side of that dangerous (10 ft.) shoal. During fogs, a bell is sounded for 1 minute, then silent for 3 minutes, and so on. The vessel is painted Red, and shows two *fixed* lights, 46 and 33 ft. high, visible 9 and 10 m. The danger lies a long league to W.N.W. of the light vessel, which is 9 leagues off nearest land to E.N.E.

The **COASTS OF SPAIN and PORTUGAL** have been sometimes visited by Indian ships, forced by stormy weather to take shelter in the nearest port, to repair damages. It may therefore be useful to describe briefly some headlands and harbours on the N. and W. sides of the Peninsula.

On Cape Machichaco, in lat. $43^{\circ} 28' N.$, lon. $2^{\circ} 49\frac{1}{4}' W.$, is a *fixed* light, with a flash every 4 minutes, and 268 ft. above H. W., visible 6 leagues.

Bayonne and Bilbao are confined harbours, and have not sufficient water for large ships over the bars. Vessels should not attempt to enter them without a pilot.

Cape Mayor, in lat. $43^{\circ} 30' N.$, lon. $3^{\circ} 48' W.$, 1 league to N.W. of Santander Port, shows a light, *revolving* every minute; 800 ft. high, seen about 7 leagues. Rivadesella exhibits a *fixed* light, which *flashes* every 4 minutes.

Gixon has a *fixed* light, near Santa Catalina Hermitage, in lat. $43^{\circ} 35' N.$, lon. $5^{\circ} 38' W.$; 167 ft. above H. W.; and visible 10 m.

Cape Penas, in lat. $43^{\circ} 42\frac{1}{4}' N.$, lon. $5^{\circ} 49\frac{1}{4}' W.$, has a light *revolving* every $\frac{1}{4}$ minute; 338 ft. above H. W.; visible about 7 leagues.

Cape Busto, in lat. $43^{\circ} 36' N.$, lon. $6^{\circ} 29' W.$, has a Red light, *flashing* every 2 minutes; it is 307 ft. high; and visible 4 leagues.

Point Estaca, the N. headland of Spain, in lat. $43^{\circ} 47' N.$, lon. $7^{\circ} 44' W.$, has a light *revolving* every minute; 310 ft. above H. W.; visible 6 leagues. **Cape Ortegal** is in lat. $43^{\circ} 45' N.$, lon. $7^{\circ} 56' W.$, but has no light.

CAPE PRIOR, about 12 leagues to S.W. of Ortegál, or in lat. $48^{\circ} 34' N.$, lon. $8^{\circ} 19' W.$, has a *fixed* light, 446 ft. above sea, and visible 15 m. This is the N. mark for Ferrol Harbour.

Cape Priorino Chico, the N.W. point of Ferrol Harbour, about 6 m. to S. of Cape Prior, has a *fixed* light, giving a *Red* flash every 2 minutes; it is 90 ft. above sea, and visible 12 m. It is in lat. $43^{\circ} 28' N.$, lon. $8^{\circ} 20' W.$

Ferrol, Corunna, Vigo, Lisbon, Cape St. Vincent, and Cadiz, have been fully described in the First Section, (pp. 1 to 5.)

CAPE FINISTERRE LIGHT is *revolving* every half-minute; elevated 466 ft.; visible 20 m.; lat. $43^{\circ} 53' N.$, lon. $9^{\circ} 15' W.$ **African Rock** is a sunken danger, lying 12 m. to N. of Finisterre Light; and there are two other rocky patches lying 2 m. and 4 m. to N.W. of this light.

Cape St. Vincent, in lat. $37^{\circ} 3' N.$, lon. $8^{\circ} 59\frac{1}{2}' W.$, has a light *revolving* every 2 minutes, 220 ft. above H.W., and visible 10 leagues.

PASSAGE to MADEIRA. After leaving the English Channel, steer to pass the island of Madeira, at any convenient distance exceeding 7 or 8 leagues. In the winter months, it is preferable to pass to the W., for strong W. gales prevail in November, December, and January, producing eddy winds and severe squalls near the island, occasioned by high land obstructing the regular course of these gales. In November, 1797, and December, 1799, Captain Horsburgh was forced to put to sea from Funchal Road; severe W. and S.W. gales, with hard squalls and rain, kept his ship at sea eight days each time, and prevented him from anchoring afterwards; the W.S.W. wind continuing to blow strong. In these gales, the island of Madeira and the Desertas were frequently obscured in fog; and the squalls, sudden and violent near the latter, and about the S.E. end of the former, nearly overset one of the ships in company.

The existence of the danger, called **Eight Stones**, to which several positions N. of Madeira have been assigned, between the parallels of 34° and 35° and the meridians of 16° and 17° , appears to be extremely doubtful; many of H.M.'s vessels having by Admiralty order passed over the spot with the object of finding them, but in vain.

PORTO SANTO is a high island with several peaked hills, about 22 miles E.N.E. of Madeira, and generally seen by ships bound for the latter: it is surrounded by several small islands, and has a bay and small town on the S. side, with anchorage, water, and refreshments. There is a small island off each of the points which form the bay. Although Porto Santo is not so high as Madeira, it may be seen 12 or 14 leagues from a ship's deck: and its peaks and uneven appearance easily distinguish it from Madeira or the Desertas, these islands having a more regular outline. The village on the S. side, Baleira, is in lat. $33^{\circ} 4' N.$, lon. $16^{\circ} 20' W.$

The bank by which Porto Santo is surrounded extends generally about 2 m. from its shores, with depths from 3 to 30 fathoms; towards the N., however, it extends 8 m. off, having near its extremity the Falcon Rocks, with $4\frac{1}{2}$ fathoms. Between these rocks and the island the average depth is 30 fathoms.

THE DESERTAS are three high barren islands, narrow, stretching N. and S. about 12 m.; they have rather an even appearance; Chao, the N. one, is lower than the others, and level. The middle Deserta is the largest, between which and Bugio, the S. one, there is a narrow channel, never to be attempted unless from necessity, as a ship is liable to be becalmed by the N. Deserta, which overtops Bugio. This channel is nearly a mile wide, and clear of danger; the soundings in it vary from 8 to 20 fathoms. The N. island is seen at 5 or 6 leagues distance, and close to its N. end there is a pyramidal rock, which may be mistaken for a ship under sail.

With the wind from the N. or N.E., bound to Funchal, the channel between Madeira and the Desertas is the most convenient, and is 10 m. wide.

MADEIRA, belonging to Portugal, is nearly 30 m. long E. and W., and its greatest breadth N. and S. about 12 m. The island is very high, and generally clouded, except in serene weather. The E. point projects from the body of the island as a narrow point for 4 m., forming to the S. a bay, with soundings from 5 to 17 fathoms. The bank of deep soundings extends off shore from 1 to 5 m., and from the E. end of the island is united to the bank surrounding the Desertas, with soundings from 20 to 32 fathoms between them. There is a perpendicular cliff, of majestic appearance, about 3 leagues W. from Funchal, called Pônta de Sol, with a small bay to the E. of it, which has anchorage from 5 to 20 fathoms near the shore.

Light. Fora Island, off the E. extreme of Madeira, has now a *fixed* light, flashing every half minute, elevated 343 ft., visible in clear weather 25 m.; lat. $32^{\circ} 43' N.$, lon. $16^{\circ} 39' W.$

Funchal, the capital of Madeira, is on the S. side of the island. The Loo Rock, situated near the shore, at the W. end of Funchal, is a high rock with a fort and a small *fixed* light. The Citadel is a brown square fort on a hill, over the N.W. part of the town. The best berth for large ships is the Citadel a little open to the E. of Loo Rock, in 30 or 35 fathoms water; about $\frac{1}{2}$ m.

from the Loo Rock. With Loo Rock and Citadel in one, bearing about N.N.E., the anchorage appears equally good, in 35 fathoms stiff ground; also further out, on same bearing, and 1 m. off Loo Rock in 45 fathoms. Farther to the W. the ground is not so good, and to the E. the bank has a sudden declivity from 50 fathoms to 100 fathoms rock, and then no ground. If S.W. winds are expected, which are frequent in winter, to anchor with the Loo and Citadel in one, or the latter just open to W. of the Loo, is a most convenient berth to put to sea from, or to ride out a S.W. gale. But the Citadel well open to the E. of the Loo is the best anchorage when S.-Easters are expected. In coming into Funchal Road with a brisk wind, sail should be reduced in time; and a ship should be brought up with her head to seaward, that in case any accident should prevent her bringing up, sail may be made off shore.

Funchal Anchorage is an unsafe open roadstead, exposed to S. gales, which in winter are violent. In October 1842, five vessels were wrecked in a few hours, and in December 1848 as many more. Therefore ships should anchor to the S. of the Loo Rock, in from 25 to 35 fathoms; from which position they can slip, and make sail to clear the rocky headlands when a gale sets in.

Steamers anchor nearer the shore. The beach is composed of shingle, and has generally a surf on it, which prevents a ship's boat from landing abreast the town; but on the N.W. side of Loo Rock, about $\frac{1}{4}$ m. from the town, is the only place safe to land from a ship's boat: the country boats are employed in watering, coaling, &c.

The Custom-house rules are rigid, and strangers suffer great annoyance and loss of time in the examination of their baggage; their boats are boarded by officers before reaching shore. If a ship enter the road by night, it is proper to show a light at her ensign-staff, to prevent being fired at from the forts. The small-pox is much dreaded at Madeira, suspected vessels are ordered to leave.

Funchal British Consulate is in lat. $32^{\circ} 38'$ N., lon. $16^{\circ} 54'$ W.; Variation of compass 22° W.

Tides. H. W. at F. and C. occurs between 12 h. and 1 h.; rise and fall about 7 ft.

CURRENTS. In summer, when the N.E. wind prevails, a S.W. current sets through the channel between Madeira and the Desertas. The current along the S. side of Madeira and the Desertas mostly sets to leeward in strong gales; but at the conclusion of a gale it sometimes changes suddenly, and sets contrary to the wind. Through the channel between Madeira and the Desertas, ships have been drifted in calm weather near either; there is no anchorage but in very deep water on the narrow banks before mentioned. In November, the *Anna* drifted in a calm very near the shore to the N. of the Brazen Head (Cape Garajao), and brought up with the stream anchor in 60 fathoms water, her stern not far from the rocky cliffs. When a ship has advanced through the channel, and is approaching Brazen Head, she should not keep near it, in case of being becalmed, as there is no anchorage close to this steep, bluff headland, which is the E. extreme of Funchal Road. Ships are frequently baffled by eddy winds and calms near it, and obliged to get boats out to tow. Do not borrow too closely to it in passing, nor haul in for the road till nearly abreast of the town.

Weather. The rainy season is said to be January, February, and March; October is also frequently a wet month; and when hard W. gales blow in November or December, they bring cloudy weather and rain. Hurricanes have blown down through the valley of Funchal; a torrent of water once poured down the mountain at the head of the valley, deluging many vineyards in its passage, and some of the houses in the town.

Winds. In summer, when the weather is settled, off Funchal Valley there are regular land and sea breezes; the sea-breeze setting in from the S.W. in the forenoon, and the land breeze coming from the shore generally about 10 o'clock at night, but sometimes not till 2 or 3 o'clock in the morning. These land-breezes do not extend above 3 or 4 m. off shore. It has been said that S. winds never blow severely quite to the shore at Funchal; that S.W. or S.E. winds are never expected, except in January, February, and the beginning of March, and that large ships always ride them out; whereas it is certain, these S. gales blow quite home to Funchal, sometimes in November and December; and when they are expected it is common for all ships to put to sea. These S.W. or S.E. gales are in general preceded by a swell, with gloomy weather, drizzling rain, and an unsettled breeze from the land, veering several points backward and forward very suddenly. With such indications, ships generally proceed to sea, for should it blow from the S., it would be almost impossible to clear the shore on either tack after cutting or slipping, the anchorage being near the land. Some ships have ridden out these S. gales, but many have driven on shore. When there is the least appearance of unsettled weather, it is best to ride with a whole cable, with a slip buoy on it, in case of being obliged to slip and put to sea quickly; as there would not be time to weigh the anchor, by the sudden approach of blowing weather. In light breezes and calms, it is proper to have a kedge anchor out, to steady the ship.

THE SALVAGES, CANARIES, AND CAPE VERDE ISLANDS.

On leaving Funchal, steer directly from the shore, to prevent being baffled by calms or eddy winds under Pónta de Sol, or the Brazen Head, for vessels are liable to calms under the high land. Departing from Madeira, or after passing to the W. of the island, the usual track is to W. of the Canary and Cape Verde Islands, barely in sight of them, where steadier winds may be expected than close to, or among these islands. The *Britannia*, outward bound, had W.S.W. and S.W. winds, and was several days close to the coast of Africa, in lat. 29° N. In January the *Swallow*, after passing in sight of, and to E. of the Canary Islands, had W. winds, which carried her to the E. of Cape Verde Islands; but it is preferable to pass to the W. of all these islands in August, September, October, and November. Many navigators, in January, February, and March, prefer the passage to the E. of all Cape Verde Islands. Captain Heathorn, of the ship *Claudine*, homeward bound from India, *twice*, in September, passed up to the N., inside of Cape Verde Islands, with steady S. winds, which changed to N.E. trade wind when to N. of these islands. Hence it appears, that in part of August and September, S. winds sometimes prevail between the coast of Africa and Cape Verde Islands; and that in the same locality, N. winds may usually be expected in December, January, and part of February.

If a ship be bound to Tenerife, or intend to pass between the Canaries, or is laid off to the S.S.E. after passing Madeira, care is requisite to avoid the Salvages, which must not be approached in the night, on account of reefs and straggling rocks extending from the Pitons, the S.W. islands.

THE SALVAGES are two distinct groups, distant from each other about 8 m. in an E.N.E. and W.S.W. direction, with safe passage between. The N.E. group is formed of the Great Salvage with its surrounding rocks. It is high and rocky, and may be seen 8 or 9 leagues. The hill near the W. point of the island is in lat. $30^{\circ} 8' \text{ N.}$, and lon. $15^{\circ} 51' \text{ W.}$ The S.W. group consists of Great and Little Piton, two islands surrounded by rocks and reefs. Little Piton is about $1\frac{1}{2}$ m. to the W. of Great Piton, and has a reef projecting beyond to the W. half a league.

THE CANARY ISLANDS, belonging to Spain, are eleven in number (four of them small), extending from lat. $27^{\circ} 40'$ to $29^{\circ} 20' \text{ N.}$, and from lon. $18^{\circ} 35'$ to $18^{\circ} 6' \text{ W.}$ They are mostly high, with steep rocky shores, rendering landing often impracticable, and all destitute of harbours for large ships. The channel between these islands and Cape Juby on African coast is 50 m. wide, and clear of danger. The channels among the Canary Islands are clear of dangers, except a *doubtful* sunken rock in lat. $27^{\circ} 52' \text{ N.}$, between Canary and Tenerife, about 7 leagues from the latter, and 5 leagues W. of the former; which many navigators think has no existence. Several of the outward-bound ships pass between Palma and Gomera, when laid off to the E. by winds from the W., or otherwise. Variation of compass at Cape Juby, 19° W. ; at Palma, 21° W.

Palma, the N.W. island, 8 leagues long and 5 leagues broad, is frequently seen by outward-bound East India ships: being nearly 8000 ft. high, with a bold coast; some navigators approach it with confidence; but several ships have been nearly lost on it in dark nights, the lights on the impending mountains first showing their situation; and even in the day it is sometimes completely obscured by fog clouds. The N. point is in lat. $28^{\circ} 51' \text{ N.}$, lon. $17^{\circ} 54' \text{ W.}$; the W. point in lat. $28^{\circ} 46' \text{ N.}$, lon. $18^{\circ} 0' \text{ W.}$; and the S. point in lat. $28^{\circ} 27' \text{ N.}$, lon. $17^{\circ} 50' \text{ W.}$ This island is said to be more subject to W. winds and rains than any of the others.

Light. Palma has now a light, *revolving* every minute, elevated 207 ft., visible 25 m. It is at the N.E. point of the island, in lat. $28^{\circ} 50' \text{ N.}$, lon. $17^{\circ} 47' \text{ W.}$

Tenerife is the largest, and from its magnificent Peak, in lat. $28^{\circ} 17' \text{ N.}$, and lon. $16^{\circ} 39' \text{ W.}$, elevated 12,000 ft., is the most remarkable of the Canary Islands. It is triangular in shape; its length from E. to W. is 47 m., and its greatest breadth from N.W. to S.E. 28 m. Tenerife N.E. extreme is in lat. $28^{\circ} 37' \text{ N.}$, lon. $16^{\circ} 9' \text{ W.}$; the S. point, lat. $28^{\circ} 0' \text{ N.}$, lon. $16^{\circ} 31' \text{ W.}$; Teno, the N.W. point, lat. $28^{\circ} 21' \text{ N.}$, lon. $16^{\circ} 56' \text{ W.}$

Santa Cruz, on the S.E. side and near the N.E. end of Tenerife, the chief town of the Canary Islands, has a red *fixed* light on the Mole Head, 36 ft. above H. W., visible 4 or 5 m. It is the port generally used by ships which stop at these islands to procure refreshments. The roadstead though indifferent, is one of the best in the Canaries. Santa Cruz is an excellent place for procuring a supply of cheap wines, of a weak quality. Vegetables are plentiful, also the fruits common in Europe, and good water is easily procured when the surf is not great on the beach. The Mole Head, Santa Cruz, is in lat. $28^{\circ} 28' \text{ N.}$, and lon. $16^{\circ} 15' \text{ W.}$

Directions. Ships going in should not bring any part of the town to the N. of W., or they may be becalmed by the high land under the Peak, and drifted on the rocky shore, where no bottom is found close to it with 200 fathoms line. Merchant ships and small vessels anchor to the N.E. of

the pier, off the town, in 18 and 20 fathoms, distant from the shore $\frac{1}{2}$ m. Ships of war anchor about $\frac{1}{2}$ m. off the N. fort, with their outer anchor in 36 fathoms, and the inner one in 15 or 18 fathoms.

While running for the anchorage, keep both leads going, and bring up to the N. of the Mole Head; or bring the clock-front of the square church tower on with a cupola bearing W.S.W., and anchor with this mark on, or to the N. of it. Ships may anchor in less than 30 fathoms, with a large scope of chain cable. When the N. fort (Paso Alto) bears N.N.W., the depth of water will be about 25 fathoms on the lines pointed out. The shore may be neared without risk, the water being deep, and no dangers that are not apparent. The anchorage to the S. of the lines indicated is reserved for vessels in quarantine. A man-of-war (especially if there are many vessels) should anchor to the N.E. or windward of this resort, the bank of soundings being wider.

Instead of running down at a great distance from the land, and not hauling in until nearly abreast of the town (as ships coming from the N. generally do), on making Punta de Anga, the N.E. end of Tenerife, some commanders haul in upon the bank of soundings on passing Punta de Antequerra, as the bank from this point to Santa Cruz extends as far from the land as at the town, and the anchorage is as good and as safe anywhere. A ship may then get nearly into the depth she proposes to anchor in, and run down with the light wind parallel to the shore. Should it fall calm when a ship is *outside* soundings, she may be taken to leeward by the S. set, causing loss of time in recovering ground. The bottom being foul in many parts of the road, it is customary to buoy the anchors. This road is exposed to E. winds, but these seldom blow hard, although ships have sometimes been driven from their anchors on shore.

Light. Anga or Roque Bermejo, the N.E. end of Tenerife, has now a light, *fixed*, and *flashing* every 30 seconds; 800 ft. above sea; visible more than 30 m. Lat. $28^{\circ} 35' N.$, lon. $16^{\circ} 8' W.$

Oratava, situated on the N.W. side of the island, has a very insecure road, where ships stop sometimes to take in wine: the anchorage is in 50 fathoms, about $1\frac{1}{2}$ m. off shore, with the Peak bearing S.W., and a pilot should be kept on board. Straggling rocks project two or three ships' length from the shore, on which the sea breaks furiously: this anchorage is very dangerous in the winter months, from September to May. Lat. of the landing-place $28^{\circ} 25' N.$, lon. $16^{\circ} 33' W.$

Canaria, or Grand Canary, extending from lat. $27^{\circ} 45'$ to $28^{\circ} 18' N.$, 12 leagues S.E. of Tenerife, is nearly round, and about 9 leagues across; and upwards of 6,000 ft. high; it is the best watered and most fertile of the islands.

Light. Isleta, the N.E. part of Grand Canary has a *fixed* light, giving Red flashes every 2 minutes; elevated 817 ft.; visible 18 m. Lat. $28^{\circ} 11' N.$, lon. $15^{\circ} 25' W.$

Palmas, the chief town, is on the N.E. side of the island; its road is sheltered from the N.E. by a point of the land stretching out in a peninsula, and having some rocks adjoining. The Palmas Mole Head, in lat. $28^{\circ} 7' N.$, lon. $15^{\circ} 25' W.$, has a *fixed* harbour light.

Gomera, about 5 leagues to the W. of Tenerife, is 5 leagues long, and its breadth 3 leagues. San Sebastian, the chief place, is in a bay on the E. side, sheltered to the N. by a projecting point. North point, lat. $28^{\circ} 13' N.$, lon. $17^{\circ} 18' W.$; East point (San Christoval), which is near Port San Sebastian, lat. $28^{\circ} 8' N.$, lon. $17^{\circ} 6' W.$

Hierro, or Ferro, the S.W. of the Canary Islands, distant 10 or 11 leagues to W.S.W. of Gomera, is 5 leagues long and 3 leagues broad. Puerto del Hierro, on its E. side, is in lat. $27^{\circ} 46' N.$, lon. $17^{\circ} 54' W.$ Its W. extreme is in lon. $18^{\circ} 10' W.$ This island was adopted by most European nations in the 17th and 18th centuries as the *First Meridian*, and is still used as such in many Swedish, Norwegian, and Russian maps. Geographers, even of the same country, appear not to have been unanimous in their assumed longitude of Ferro, but the English generally reckoned it in lon. $18^{\circ} 10' W.$ of London, and the French 20° or $20^{\circ} 20' W.$ of Paris. In the Swedish charts of the late Admiral Klint it is assumed $20^{\circ} 30' W.$ of Paris.

Fuerteventura is about 20 leagues long, and from 2 to 5 leagues broad, the S.W. point being in lat. $28^{\circ} 3' N.$, lon. $14^{\circ} 31' W.$, and the N. point in lat. $28^{\circ} 45' N.$, and lon. $13^{\circ} 54' W.$

Light. Jandia Point, the S.W. end of Fuerteventura, has a light *revolving* every minute; 108 ft. high; visible 15 m. A bank extends 1 m. to S.W. of it.

Lobos Island has a *fixed* Red light; 95 ft. above sea, on Martino Point; visible 9 m. Lat. $28^{\circ} 45' N.$, lon. $13^{\circ} 49' W.$ Off Martino Point, the N. end of Lobos, there is an extensive reef.

Lanzarote, or Lancerota, about 6 leagues long and 4 leagues broad, lies to the N.E. of Fuerteventura, being separated from it by the Bocayno Channel, in which is the Island Lobos, 1 league long and $\frac{1}{2}$ a league broad. The passage between Lobos and Fuerteventura is 2 m. wide, with 5 fathoms water, and good anchorage. The channel next Lanzarote is 4 m. wide, with 10 fathoms water. The East Rock, off the N. end of Lanzarote, is in lat. $29^{\circ} 16' N.$, lon. $13^{\circ} 20' W.$ On the S.E. side of Lanzarote are two ports within reefs, called Puerto de Naos and

Puerto de Cavallos; the former is the N. one, sheltered from N.E. winds by the reefs, and here vessels may refit. It has two entrances between reefs, with only 14 ft. at H. W. in the N., and 17 ft. in the S. entrance; the depth within is 27 to 10 ft.; rise of tide 10 ft. Naos Port, at Arecife, has 2 small *Red* lights. Puerto de Cavallos, 1 m. S. of the former, has only 12 ft. in the channel, and within, 17 ft. Fort St. Gabriel, at Arecife, is in lat. $28^{\circ} 57' N.$, lon. $13^{\circ} 32' W.$

Graciosa, Santa Clara, and Alegranza, are three small islands off the N. point of Lanzarote; uninhabited, and destitute of fresh water. The channel between Graciosa and Lanzarote forms the harbour of El Rio, in which the depth is 6 or 7 fathoms. The N. point of Graciosa is in lat. $29^{\circ} 17' N.$, and lon. $13^{\circ} 31' W.$ The centre peak of Santa Clara is in lat. $29^{\circ} 18' N.$, and lon. $13^{\circ} 32' W.$ There is a channel between Clara and Alegranza.

Light. Alegranza Island has now, on Delgada Point, a light *revolving* every 30 seconds; elevated 57 ft.; visible 13 m.; but not seen from the W. when bearing between S.E. and E. Lat. $29^{\circ} 24' N.$, lon. $13^{\circ} 30' W.$

Passage along African Coast, inside Cape Verde Islands. Some outward-bound ships for India, or St. Helena, prefer the channel between Cape Verde and the Cape Verde Islands; keeping in longitude between 19° and $20^{\circ} W.$ in passing the islands, to avoid some *doubtful* dangers placed to the E. of them. Other ships keep nearer to the continent, where the channel is clear, with soundings near land. (See Chapter V.) A great haze along the coast, occasioned by dust and dry vapour, being driven to seaward by N.E. winds from the hot sandy desert, makes the passage near the low coast of Africa less preferable to that outside Cape Verde Islands, when the sun is far to the S; for steady N. winds then prevail near the continent, and the route is shorter than that to the W. The obscure atmosphere renders the inner passage unpleasant when observations are not regularly obtained, near the coast; but the *revolving* light, set up by the French on Cape Verde, greatly helps navigation. The ship, *Evander*, was set by current into the deep bay on N. side of the Cape, and had no soundings with 100 fathoms line, about 8 m. off shore, the Cape bearing W.S.W. about 5 leagues distant; nor were any soundings got afterwards in passing within a few miles of the Cape.

Cape Verde and the African Coast are described further on at Chapter V.

THE CAPE VERDE ISLANDS, consisting of ten principal, and some small isles, extend from lat. $14^{\circ} 43'$ to $17^{\circ} 18' N.$, and from lon. $22^{\circ} 28'$ to $25^{\circ} 27' W.$: they are mostly high, and some have sheltered bays, with tolerable anchorage.

St. Antonio, the N.W. island, is often seen by ships passing to the W. of them; the summit is 7,400 ft. above the sea; it may therefore be seen near 30 leagues from a ship's deck, in clear weather, which is seldom the case, hazy or cloudy weather mostly prevailing about these islands. Pônta de Sol, the N. point, which may always be known by several white houses, projects in a low sand, with a reef extending about $\frac{1}{4}$ m. farther; at $1\frac{1}{4}$ m. off the point, there is no ground at 130 fathoms. From hence to the W. end of the island, the coast should not be approached within 2 m., for fear of calms. Between the N. and N.E. points, a vessel should not come within 5 m. of land, as she may have light winds, and be set on the island by the swell. By the survey of H.M.S. *Leven*, the N. point of the island is in lat. $17^{\circ} 12' N.$, lon. $25^{\circ} 6' W.$; S. point, in lat. $16^{\circ} 55' N.$, lon. $25^{\circ} 18\frac{1}{4}' W.$; the E. point, $17^{\circ} 5\frac{1}{4}' N.$, lon. $25^{\circ} 0' W.$; and W. point, $17^{\circ} 4' N.$, lon. $25^{\circ} 23' W.$

On the W. side of the island there is a small bight, called Tarafal Bay, where excellent fresh water may be got, and anchorage in from 35 to 40 fathoms, about $\frac{1}{4}$ m. off the sandy beach, where H.M.S. *Leven* remained some time in the summer of 1820: there was very little surf, the anchorage being protected from the N.E. trade-wind by the mountainous land; and a light sea-breeze or eddy wind in the heat of the day sometimes occurred. This bay is known by a small green plantation, and a black sandy beach under a cliff. The square sails should be furled, and all boats made ready to tow a ship in, when becalmed under the high land; the jolly-boat should be previously sent in and anchored in 30 fathoms as a guide, opposite to a Red mark in the cliff. The best anchorage is in 39 to 35 fathoms, about $\frac{1}{4}$ m. off shore, soft bottom, where a ship may lie very smooth under the mountain, with its altitude about 25° ; the N. extreme of land bearing N. by W., the S. extreme S. $25^{\circ} W.$, Red mark on the cliff S.E. by S. This bay is open from N. by W. to S.W. by S. Variation $19^{\circ} 30' W.$

The channel between St. Antonio and St. Vincent is safe. In passing through, you may be guided by your eye to keep clear of the light winds occasioned by either island.

St. Vincent, 7 m. S.E. of Antonio, is about 12 m. long from E. to W., and 7 broad, having two chains of mountains running parallel to its S. and N.E. sides, with a valley in centre, at the N.W. opening of which is the Bay of Porto Grande—the best anchorage of the Cape Verde Islands. Here is security from the sea, with a fresh breeze generally blowing; much wood may

be cut in a short time, and a ship may be refitted with safety. The harbour is open to the W.: but St. Antonio, being only 9 m. distant, always shelters it from N.W. winds. Water from the well is not good; when refitted, a ship may run down in 5 or 6 hours to Tarafal Bay, in St. Antonio, and there complete her water. A few lean cattle may be procured.

St. Vincent is said to have anchorage all round. The *Devonshire*, on her passage to India, found anchorage midway in a bay on the S.W. side of the island, about $2\frac{1}{2}$ or 3 m. off shore, from each extreme of the land about 4 m., in 22 fathoms water, with a bottom of sand and coral. One well was discovered, and another dug near it at the head of this bay, where she filled up her water during a stay of several days. The N. point of St. Vincent is in lat. $16^{\circ} 54' N.$, lon. $24^{\circ} 59' W.$; S. point, in lat. $16^{\circ} 47' N.$, lon. $25^{\circ} W.$; E. point, in lat. $16^{\circ} 50' N.$, lon. $24^{\circ} 55' W.$; W. point, lat. $16^{\circ} 50' N.$, lon. $52^{\circ} 8' W.$; Porto Grande Custom House, lat. $16^{\circ} 54' N.$, lon. $25^{\circ} W.$; Bird Island, lat. $16^{\circ} 55' N.$, lon. $25^{\circ} 1' W.$

St. Lucea, about 5 m. E.S.E. from St. Vincent, is about 6 m. long from N.W. to S.E., irregular hilly, and occasionally inhabited by fishermen. Its S. shore, which runs E. and W., is fronted by a bank, extending $\frac{1}{2}$ m. off, on the edge of which are 2 to 4 fathoms. It then suddenly deepens to 8, 9, and 10 fathoms, and soundings slightly increasing in depth, are carried across to Branco Island. There is a good landing-place near the middle of the S. shore of Lucea, and a well of fresh water near a ruined village on its S.W. side, W.S.W. from the little islet of Leon. In the Channel, S. of Lucea, the flood runs to the W., and ebb to the E., about 2 m. an hour at spring tides; but the wind has great influence on them. On F. or C. of moon it is H. W. about 9 h. or 10 h. In this Channel, do not go too close to the E. of St. Lucea, the ground being uneven. There are soundings 2 or 3 m. to windward of St. Lucea, with discoloured water. Between St. Lucea and St. Vincent there is a channel, through which the *Leven* passed; and here, when blowing fresh, the tide setting to windward, has the appearance of shoal water; but she did not find less than 6 fathoms in working through, with 15 fathoms in mid-channel. The N. point of St. Lucea is in lat. $16^{\circ} 49' N.$, lon. $24^{\circ} 47' W.$; S. point in lat. $16^{\circ} 48' N.$, lon. $24^{\circ} 48' W.$; E. point in lat. $16^{\circ} 45' N.$, lon. $24^{\circ} 43' W.$; W. point in lat. $16^{\circ} 47' N.$, lon. $24^{\circ} 50' W.$

Branco, in lat. $16^{\circ} 40' N.$, lon. $24^{\circ} 42' W.$, is about 2 m. long and $\frac{1}{2}$ m. broad, inaccessible in bad weather. A low sandy point projects a short way from its S.E. end, with a reef off it, which is visible. The *Leven* beat through the passage between this island and Raza, and had irregular soundings. She also went through between Raza and St. Nicolas, which is a good passage; but the tides and currents between these islands are sometimes strong and irregular, and greatly influenced by winds, rendering a good look-out necessary.

Raza, in lat. $16^{\circ} 38' N.$, lon. $24^{\circ} 38' W.$, is a small uninhabited island, about $1\frac{1}{2}$ m. in diameter, at times inaccessible: there is no fresh water on it, and the bottom near it is rocky. The landing place is near its N.W. point.

St. Nicolas, about 5 leagues S.E. of St. Lucea, may be seen 16 leagues in clear weather: it is the most pleasant of these islands, and the residence of the bishop: on the S. side there are several indifferent anchoring-places. Grand, or St. George Bay, where the trade of the island is carried on, is on the W. side of that large bight formed by the E. and S. points of the island. It has anchorage in 7 fathoms, clear ground, close to the shore; but out in 9 and 10 fathoms the ground is rocky. Here refreshments may be procured, but there is no watering-place for a ship. This bay may be known by the White Fort, which stands on a hill, and which is seen immediately after rounding the S. point of the island from the W.; but ships requiring refreshments generally stand off and on, the anchorage being very close in. The chief town is about 4 m. inland from the landing place, and there the bishop and governor reside.

Tarafal Bay, near the S.E. shore of which is the Custom-house, is between the S. and W. points of the island. Soundings extend from this Bay off shore about 1 m. towards the W. point, which is low and rocky. A ship might anchor here in the calm to repair damage, about 3 m. to the S. of the W. point, the breeze not reaching so far down, except in the rainy season, when it would be dangerous, as the wind then comes in from the S. Close in shore, if blowing strong outside, the tide will run 9 or 10 hours to the N. H.M.S. *Leven* anchored twice here, in 18 fathoms, the W. point bearing N. $16^{\circ} E.$, off shore 1 m. The N. point of St. Nicolas is in lat. $16^{\circ} 42' N.$, lon. $24^{\circ} 21' W.$; S. point in lat. $16^{\circ} 28' N.$, lon. $24^{\circ} 19' W.$; East point in lat. $16^{\circ} 34' N.$, lon. $24^{\circ} 0' W.$; W. point in lat. $16^{\circ} 38' N.$, lon. $24^{\circ} 26' W.$

Sal Island, 20 leagues to E. of St. Nicolas, is high and bold, with two peaks, and may be seen 14 or 15 leagues in clear weather. The E. peak is highest, and the land between being low, they appear like two islands when first seen. In rounding the island, a ship should not approach too close to the S. point, which is low, extending out several miles in a sandy spit, not visible in the night nor in hazy weather. The N. point is in lat. $16^{\circ} 51' N.$, lon. $22^{\circ} 55' W.$; the S. point in lat. $16^{\circ} 34' N.$, lon. $22^{\circ} 57' W.$; E. point, lat. $16^{\circ} 40' N.$, lon. $22^{\circ} 57' W.$; W. point, in lat.

16° 48' N., lon. 23° 4' W. To the N.N.E. of the Island of Sal, in lat. 18° 40' N., lon. 21° 28' W., a shoal is said to have been lately seen by a French ship, but its existence seems very doubtful.

Mordeira Bay, on the W. side of Sal Island, affords tolerable anchorage; except in the rainy season, when the wind comes from S. at times; but a chain should be used, the bottom being foul ground: neither wood nor water is to be got here for shipping.

Bonavista is high, very uneven, with hills and valleys, and in some places low points project into the sea; the E. extreme is a low projecting point, not discernible until near it. From this low point, a reef of rocks with foul ground extends 1 m. or more to E.; and also to the N. of this point, about 2 m. from shore, are several rocky islets, with (to the N.E.) an extensive reef, on which the outward-bound East India ship *Hartwell* was wrecked, with loss of cargo and most of the treasure. The *Resolution*, Captain Cook, in her voyage to the South Sea, was nearly sharing the same fate in the night, owing to a S. current; and several other ships have suffered on this reef.

In thick or misty weather, great care is necessary when approaching this island, as currents are sometimes strong and irregular; and fine sand or dust blown off the desert of Africa makes the atmosphere frequently so thick, that land cannot be seen before you are in the surf. The current generally sets to the S.W. from 10 to 15 m. a day, many rippings indicate its direction, and the sea is much discoloured, as if in soundings. To these currents may be safely attributed the loss of the *Hartwell*; and the vessels reported to have been wrecked on the Bonetta and Madeline rocks were lost probably on the dangerous shoals which bound the N.E. end of Bonavista.

The N. point of Bonavista is in lat. 16° 13' N., lon. 22° 59' W.; the S. point in lat. 15° 57' N., lon. 22° 50' W.; N.E. point in lat. 16° 11' N., lon. 22° 47' W.; W. point in lat. 16° 2' N., lon. 23° 2' W. There is anchorage here in English Road, Portuguese Road, and off the Coral Reef; but there is no town except at English Harbour, where you may anchor inside or outside the reef off the small island; but it is dangerous to remain at anchor, when heavy rollers prevail about the island. Tide rises 5 ft.; H. W. at 7 h. at F. and C. of the moon.

Leton Rock, or Reef, lat. 15° 48' N., lon. 23° 10' W., is very dangerous, and much in the way of ships passing to the W. of Bonavista. There seems to be another reef well to the N. of Leton Rock, and much nearer to Bonavista. These dangers render the channel to the W. of Bonavista unsafe in thick weather, or in the night; for it is thought the sea does not break on these reefs with smooth water; but when there is much swell, breakers roll over them.

If an outward-bound ship intend to stop at Porto Praya, in the Island St. Jago, which is frequented by ships in want of water, it will be prudent to steer for Sal, or Bonavista; and to avoid the danger to the W. and S.W. of the latter, she may pass on the E. side of these islands; or on the W. side of Sal, if the wind be far from the N.; then well to the W. of the shoals, and afterwards for Isle Mayo; passing to the W. of which she will easily reach Porto Praya Road. If the wind incline from the E., passing to windward of them will be most convenient for reaching Porto Praya with speed. In running for these islands, look out in time, for the current generally sets to the S. amongst them, sometimes strong.

Mayo or Maio Island, bearing from Bonavista nearly S.S.W., distant 14 leagues, has a reef of rocks projecting N.E. from the N. end about 2 m.; and this being a low point, makes it unsafe to approach in the night. There are 45 fathoms at 5 or 6 m. to the N. of this reef, and the soundings extend to Leton Rock, and thence to the coral reef off Bonavista. This island may be seen 10 or 11 leagues, being high at the centre, uneven, hilly, and has anchorage under the S.W. end in 7 or 8 fathoms, in a bay called English Road. The shore to the E., and abreast the town of Mayo, is steep, bluff, and rocky; but to the W. a low, white, sandy beach extends to a rounding point, from which a spit of sand and coral stretches out a few cables' lengths, near which there is no ground at 40 and 50 fathoms. This spit may be rounded in 17 to 15 fathoms, and a ship should not anchor in the road farther out than 16 or 17 fathoms, as these depths are on the edge of the bank. A vessel may anchor at the S. side of the island, and in several other places, but there is no town except at English Road. The cattle are better here than at any of the other Cape Verde Islands. Salt is produced in great abundance, and a number of American ships load with it annually. No wood is to be obtained for shipping. The N. point is in lat. 15° 19' N., lon. 23° 12' W.; S. point in lat. 15° 6½' N., lon. 23° 10' W.; E. point in lat. 15° 14' N., lon. 23° 8' W.; the W. point in lat. 15° 10' N., lon. 23° 16' W. Mayo should be passed on its E. side, if the wind be from E., but with the wind inclining from N. or N.N.W. it should be passed on its W. side.

ST. JAGO, or YAGO, the chief of the Cape Verde Islands, is about 32 m. long and 15 m. broad; 7000 ft. high; generally sterile, but having some fertile spots which produce fruit and vegetables. Porto Praya, the most important harbour amongst these islands, is situated at its S. point. The S.E. point of St. Jago appears low when seen either from the N. or S., and projects considerably; to the S.W. about 6 m. from it, is Porto Praya, the principal port in the Island.

Tides. H. W. at F. and C. of moon occurs at 6 h.; rise of tide 5 ft.

St. Francis Bay, resembling that of Porto Praya, having a brown sandy beach, with some date trees and houses, is situated between the E. point of Praya Bay and the S.E. point of the island, about $1\frac{1}{2}$ m. to the W. of the latter. Some vessels have been in danger by mistaking this Bay for that of Porto Praya, the E. points of both being fronted by sunken rocks. Porto Praya, however, is between 4 and 5 m. farther to S.W., the intermediate coast mostly perpendicular, and approachable within $1\frac{1}{2}$ m. in 10 fathoms water. The Fort, on a small cliff in Porto Praya, is a mark to distinguish that bay from St. Francis; and the N. or E. point of the latter is surrounded with breakers, whereas the E. point of Praya Bay is high, steep, and free from danger.

The W. point of Porto Praya has a battery, by which the Bay is often first distinguished, and the sea always breaks off this W. point to some distance. In running for this place with a brisk N.E. wind, a ship should have a reef or two in her topsails when she approaches the E. point of the Bay, and this may be passed a cable's length off, in 9 fathoms; the same distance from the E. side of the Bay, in 7 or 8 fathoms, is proper in sailing to the anchorage. The E. shore of the Bay is high, and all the land seems parched and barren.

Porto Praya is a fine bay; its two points bear from each other about W. and E. $1\frac{1}{2}$ m. distant, and it is of equal depth. After passing the E. point, the fort at the bottom of the Bay soon opens; to the W. of which, in a valley, are several date trees and a small house. The Isle of Quails, a small, flat, black island, is on the W. side of the Bay, having rocks off its S. end about half a cable's length; also a rocky ledge off the N. end, where the water is in general shoal, for 3 fathoms is the greatest depth between this isle and the fort. Between it and the W. shore the channel is only navigable for boats. From the W. point of the Bay some rocks extend seaward; and it requires care to avoid them in sailing from the anchorage in the night. The best anchorage is, to bring the fort N.W. about $\frac{3}{4}$ m.; the S. part of Quail Isle W. by S. about $\frac{1}{4}$ m.; or Red Hill just open to N. of the N. part of Quail Island, in 7 or 8 fathoms. Nearer to the N.E. side of the Bay is more convenient to weigh from in light winds, to prevent being carried near the rocks to leeward by currents, before a ship has good way through the water.

Winds. The winds are generally in the N.E. quarter, and frequently the weather is cloudy, with squalls; rain seldom falls, except in July, August, and September; but a dry haze mostly prevails about these islands. In December and January the winds keep sometimes far to the E., veering at times to the N. When the weather is settled, there are often regular land and sea breezes in the Bay of Porto Praya; the sea breeze setting in near noon, with a great surf on the shore, and ending at four or five o'clock in the afternoon. The N.E. wind sets in towards evening, and continues during the night. In July, August, September, and October, strong S. winds are liable to happen at times, blowing two or three hours, and forcing a heavy swell into the Bay, which frequently breaks, rendering the anchorage rather dangerous: therefore ships at this time should anchor well outside of Quail Island, in order to clear the land in getting under weigh, or if obliged to slip and proceed to sea. But these S. gales do not happen every year.

Supplies. Water, which was formerly supplied from a cistern at the bottom of Castle Hill, is now conducted to the beach with greater facility, and good. Merchant vessels are supplied by the boatmen, who bring water off in rafts, charging 3d. for a large cask. This is an indifferent place for a ship to procure refreshments; but sometimes pigs, goats, poultry, oranges, limes, and pine-apples, are plentiful at moderate prices, and Spanish dollars or Portuguese coins are best for payment.

Quail Island is in lat. $14^{\circ} 54' N.$, lon. $23^{\circ} 31' W.$ The N. point of St. Jago is in lat. $15^{\circ} 20' N.$, lon. $23^{\circ} 47' W.$; S.W. point in lat. $14^{\circ} 58' N.$, lon. $23^{\circ} 44' W.$; E. point in lat. $15^{\circ} 0' N.$, lon. $23^{\circ} 28' W.$; W. point in lat. $15^{\circ} 17' N.$, lon. $23^{\circ} 48' W.$ Variation $18\frac{1}{2}^{\circ} W.$

Fogo, or St. Philip, about 5 leagues across, nearly circular, is nearly 10,000 ft. high, forming a volcanic peak, and generally clouded. A ship may anchor off the town of Luz, on its W. side; but the water is very deep, with a great surf on the beach, and landing difficult. Fruit may be got in the season, but there is no water for shipping. There are a few mulatto or negro inhabitants, who raise vegetables, and rear goats and cattle. At the N. and N.E. points of the island the currents are strong, influenced by the strength of winds outside: close to these points vessels are liable to light winds, under the high land. The N. point of island is in lat. $15^{\circ} 2' N.$, lon. $24^{\circ} 22' W.$; S. point in lat. $14^{\circ} 49' N.$, lon. $24^{\circ} 25' W.$; W. point in lat. $14^{\circ} 54' N.$, lon. $24^{\circ} 34' W.$ Fogo Peak is in lat. $14^{\circ} 56' N.$, lon. $24^{\circ} 20' W.$

Brava, 9 m. to the W. of Fogo, is 2000 ft. high and small, but one of the most fruitful. Porto Furno, on the E. side, is a good harbour for small vessels, with a narrow entrance, which obliges ships to warp out. Porto Furreo, on the S. side, and Porto Fagen Dago, on the W. side, are said to afford good shelter for small vessels, where water and refreshments may be procured;

but this island has no safe anchorage for large ships, neither can wood nor water be got for such ships. The N. point of the island is in lat. $14^{\circ} 52' N.$, lon. $24^{\circ} 44' W.$; S. point in lat. $14^{\circ} 46' N.$, lon. $24^{\circ} 43' W.$; E. point in lat. $14^{\circ} 51' N.$, lon. $24^{\circ} 43' W.$; W. point in lat. $14^{\circ} 50' N.$, lon. $24^{\circ} 46' W.$ There are two islets, called the *Rombos*, with rocks between them, about 5 m. N.N.E. from the N. end of Brava.

EQUATORIAL LIMITS OF THE ATLANTIC TRADE WINDS.

The following Table, drawn up by Captain Horsburgh from many East India ships' journals, will readily be comprehended without explanation. It may however be observed that the limit of N.E. trade (marked in table) is the place where wind was found steady between N. and E.; and the limit of S.E. trade is where wind was experienced settled between E. and S.S.E. The winds which blow between S. by E. and S.S.W. to the N. of the equator, and the same winds which prevail from the equator to several degrees of S. latitude near the African coast, are not marked as part of the S.E. trade, but are included in the space of variable winds between the trades. These S. and S.S.W. winds, adjacent to the S.E. trade, are monsoon winds which prevail near African coast through several degrees of latitude, when the sun is in the N. hemisphere, particularly in June, July, August, and September; the shores of Africa, being then greatly heated, draw the S. winds far to the N. of the equator. In this season the progress of outward-bound ships is greatly obstructed between the trades by S. winds and N.W. currents which frequently attend them.

Many of the ships mentioned in this table were in company with fleets, it being a period of war great part of the time. The longitude is by chronometers, or lunar observations.

A TABLE

EXTRACTED FROM 238 EAST-INDIA SHIPS' JOURNALS, TO SHOW

THE EQUATORIAL LIMITS OF THE ATLANTIC TRADE WINDS.

Year.	Outward Bound Ships.	Lost N.E. Trade.			S.E. Trade began.			Winds, &c., between the Trades.
		Month.	Lat.	Lon.	Month.	Lat.	Lon.	
1794	Nancy . . .	Jan.	21 10 30 N.	14 0 W.	Feb.	17 8 0 S.	6 0 E.	{ Had S.W. winds near African Coast, veered to South in lat. 8° S. Had S.W. and S.S.W. winds till lat. 4½° S., veered to S.S.E. gradually.
1795	Swallow . . .		29 10 30	18 0		24 4 0	2 30	
1799	Taunton Castle . . .		24 5 0	22 0	Jan.	31 2 0 N.	22 30 W.	
1802	Arniston . . .		24 7 0	16 0	Mar.	5 9 0 S.	1 0 E.	{ Had calms and faint airs to equator, S.S.W. winds in S. latitude. S.W. winds from 4½° lat. to 7° S. then veering to S. & S by E.
1803	Royal George . . .		30 7 0	15 0	Feb.	25 9 30	1 30	
1792	Rockingham . . .	Feb.	6 7 0	21 30		17 0 30 N.	24 0 W.	
	Ganges . . .		26 10 0	21 30	Mar.	7 2 0	21 30	Variable. From 11° to 6° N. had N.W. winds. { Light S.W. wind from Cape Palmas Feb. 12, afterwards S. by W. & S.S.W. Variable winds mostly from the S. N.W. and variable winds. Variable.
	Lord Macartney . . .		26 11 0	20 30		8 2 30	20 0	
1793	Royal Charlotte . . .		1 8 30	16 12		9 11 0 S.	1 0	
	Triton . . .		3 5 30	21 0	Feb.	11 1 0 N.	18 30	{ Had N. & N.W. airs to lat. 5° N.; then S.W. & S.S.W. light winds to 6° S. Southerly and variable. Variable.
	Woodcote . . .		3 7 0	21 30		10 1 0	20 30	
1800	Arniston . . .		13 6 0	21 0		27 1 0	21 0	
1801	Rose . . .		25 9 30	23 0	Mar.	5 2 30	20 0	{ Had N. & N.W. airs to lat. 5° N.; then S.W. & S.S.W. light winds to 6° S. Southerly and variable. Variable.
1803	City of London . . .		21 8 30	16 40		27 7 0 S.	2 0 E.	
1792	Europa . . .	Mar.	14 8 1	21 0	Apr.	3 1 0 N.	22 0 W.	
	Middlesex . . .		10 4 40	23 0	Mar.	18 1 0	23 0	Variable and Southerly. { Calms and S.W. breezes in N. lat. S.S.W. from equator to 6° S. N.W. and variable winds to 1° S. lat.; then S.S.W. to 5° S. Variable.
	Sir Edward Hughes . . .		10 8 30	22 30		19 2 0	22 0	
	Earl Weycombe . . .		15 6 30	21 0		27 1 30	22 0	
	Duke of Buccleugh . . .		29 6 0	20 0	Apr.	12 2 30	22 30	Variable and Southerly. { Calms and S.W. breezes in N. lat. S.S.W. from equator to 6° S. N.W. and variable winds to 1° S. lat.; then S.S.W. to 5° S. Variable.
	General Goddard . . .		22 5 0	21 30	Mar.	27 2 0	22 0	
	Valentine . . .		31 7 30	14 30	May	3 4 0 S.	5 30 E.	
1796	Georgina . . .		18 10 0	18 0	Apr.	25 5 26	3 0	Variable. N. Westerly and variable. Northerly. Variable. S.W. light, variable, and calms. Variable.
1797	Sir Edward Hughes . . .		24 2 0	19 30	Mar.	29 2 0	17 30 W.	
1798	Bombay Castle . . .		25 2 30	20 0		31 0 30	22 0	
	Earl Howe . . .		25 2 30	18 0	Apr.	4 0 0	21 0	Variable. N. Westerly and variable. Variable. S.W. light, variable, and calms. Variable.
1802	Marquis of Ely . . .		12 4 0	22 0	Mar.	21 2 0	24 0	
	Canton . . .		14 3 30	23 0		25 4 0	25 0	
	Cirencester . . .		20 4 0	23 0		25 0 0	23 0	Variable. N. Westerly and variable. Variable. S.W. light, variable, and calms. Variable.
	L. J. Dundas . . .		27 7 0	24 0	Apr.	10 3 0	19 0	
	David Scott . . .		22 6 30	17 0		8 5 0	9 0	
	Marquis Wellesley . . .		25 8 0	23 0		7 3 40 N.	17 0	Variable. N. Westerly and variable. Variable. S.W. light, variable, and calms. Variable.
1803	Carmarthen . . .		11 3 30	21 0	Mar.	17 0 28 S.	22 0	
	Walpole . . .		25 4 20	22 0	Apr.	5 0 0	21 0	
1804	Windham . . .		16 2 30	21 40	Mar.	24 0 0	23 15	Variable. N. Westerly and variable. Variable. S.W. light, variable, and calms. Variable.
1803	Experiment . . .		12 3 0	21 30		14 0 36 N.	21 20	
1804	Sir Edward Hughes . . .		6 6 0	18 0		16 0 20 S.	13 0	
	David Scott . . .		31 13 0	18 0	Apr.	11 3 30	21 30	{ Calms and S.W. winds from 5° N. to 3° S.; S. by W. near Anno-Bom. S.W. and S.S.W. winds. Variable.
1792	Melville Castle . . .	Apr.	1 6 0	24 0		5 3 30 N.	25 0	
	Duke of Montrose . . .		5 5 30	21 0		16 0 30	22 0	
1794	Duke of Buccleugh . . .		20 11 30	19 0	June	9 4 0 S.	7 0 E.	Variable. Variable from the Northward. Variable. South and S. Westerly.
1795	Arniston . . .		27 4 0	18 0	May	6 1 30	15 0 W.	
1797	Rose . . .		11 4 0	20 0	Apr.	15 1 0 N.	20 0	
1798	Walpole . . .		17 8 0	21 30		27 2 8	22 0	Variable from the Northward. Variable. South and S. Westerly.
1800	Lord Nelson . . .		15 4 0	21 0		20 1 30	23 0	
1801	Lord Duncan . . .		28 4 0	25 0	May	1 1 0	25 0	
1802	Lord Nelson . . .		8 3 36	20 0	Apr.	20 1 0	20 0	Variable from the Northward. Variable. South and S. Westerly.
1803	Huddart . . .		13 7 0	16 0		30 1 0	13 20	

Year.	Outward-Bound Ships.	Lost N.E. Trade.			S. E. Trade began.			Winds, &c., between the Trades.
		Month.	Lat.	Lon.	Month.	Lat.	Lon.	
			° ' "	° ' "		° ' "	° ' "	
1804	Lord Nelson . . .	Apr.	15 6 0 N.	24 0 W.	Apr.	20 2 0 N.	25 0 W.	
	L. J. Dundas . . .		15 5 25	25 0		20 2 0	26 0	
	Fame . . .		22 5 28	21 30		29 3 0	21 0	
1805	Walpole . . .		8 1 40	21 0		14 0 0	21 0	
	Charlton . . .		15 3 30	17 30	May	3 2 30 S.	21 0	
1791	Kent . . .	May	5 5 20	20 0		8 3 30 N.	21 0	
	Dublin . . .		28 6 25	25 0		29 6 0	25 30	No light winds.
1792	Lascelles . . .		2 7 0	21 0		7 4 0	17 0	Variable.
	Sullivan . . .		4 6 0	22 30		11 2 30	20 0	Variable and Southerly.
	Rose . . .		17 6 0	24 0		25 2 30	26 0	
	Busbridge . . .		18 7 0	22 0		25 2 0	25 0	
	Thetis . . .		30 10 0	19 30	June	17 2 0 S.	25 0	Southerly.
1793	Exeter . . .		6 9 0	21 30	May	25 4 0 N.	20 0	
1796	Canton . . .		7 18 0	19 30		23 0 30 S.	24 0	
1797	Ceres . . .		5 4 0	20 0		18 1 30	22 30	Southerly and Variable.
1798	Contractor . . .		31 8 0	25 30	June	9 5 0 N.	20 0	
1799	Glatton . . .		4 6 0	18 0		27 7 30 S.	5 0 E.	{ Calms near St. Thomas; S.S.W. and S. winds in S. lat,
	Sir Edward Hughes . . .		4 3 40	20 30	May	10 1 0 N.	22 0 W.	Variable.
	Sir Stp. Lushington . . .		16 6 0	21 30		23 4 0	20 30	Southerly.
	Lord Hawkebury . . .		19 7 30	18 0	June	9 0 0	14 0	{ Southerly: May 30, in 3° N. and 52° W., stood W., with S. winds.
1801	Princess Charlotte . . .		23 8 0	24 0	May	31 1 40	24 30	Variable.
1802	Earl St. Vincent . . .		10 7 0	22 0		21 3 0	20 30	
	Anna . . .		10 7 0	21 30		18 3 30	20 20	Variable and calms.
	Cuffnells . . .		28 8 30	22 0	June	4 5 0	21 0	
	Britannia . . .		30 9 0	22 0		12 4 0	17 30	Southerly and variable.
	Tallicherry . . .		10 7 0	25 0	May	14 3 0	27 0	Variable.
	Herculean . . .		30 11 0	21 30	June	10 2 30	24 0	Variable and Southerly.
1803	Warren Hastings . . .		5 9 30	23 40	May	21 2 0	25 0	
	Earl Howe . . .		30 7 50	23 0	June	6 3 40	19 30	
	Lord Castlereagh . . .		25 9 0	22 0		5 3 30	22 0	
	Ceylon . . .		29 9 30	21 0		8 4 0	19 0	
	Preston . . .		29 7 0	23 0		5 3 30	20 0	
	Warley . . .		29 7 38	21 0		7 3 40	16 0	
	Alfred . . .		30 9 0	21 40		7 4 20	16 30	
	Ganges . . .		31 8 0	22 30		6 3 50	19 0	
	Coutts . . .		30 9 30	21 0		7 3 40	17 0	
	Abergavenny . . .		23 8 0	22 0		6 2 0	20 0	
	Union . . .		5 10 0	24 0	May	21 2 0	23 0	Southerly.
	Ocean . . .		30 6 30	23 0	June	8 2 0	23 0	Variable.
1805	Coutts . . .		23 7 0	22 30		1 2 0	20 0	
1791	Bridgewater . . .	June	16 16 0	19 30	July	4 5 0	20 0	N.N.W. winds to 12½° N. then variable.
	Essex . . .		23 13 30	16 0		13 3 0	16 0	Calms and Southerly winds.
	Bellmont . . .		26 10 30	23 30		3 3 0	20 30	Variable.
1794	Woodford . . .		3 8 0	23 0	June	11 5 0	20 0	Variable mostly at S.
1796	Young William . . .		15 9 30	23 30		22 4 30	23 0	
	Warren Hastings . . .		17 4 50	23 50		18 4 40	24 0	Had no light winds.
1798	Tallicherry . . .		30 12 0	26 0	July	10 3 0	24 0	Variable and S. Westerly.
1800	Hugh Inglis . . .		1 10 0	25 0	June	16 2 0	23 0	Southerly.
	Rockingham . . .		29 10 0	25 9	July	14 2 0	26 0	
1801	Abergavenny . . .		22 13 0	22 30		12 2 0	17 0	{ Light N. winds to 6° N., then S.W. and S.S.W. winds.
1802	Fame . . .		13 11 0	25 30	June	23 1 30	21 0	Southerly and variable.
	Sir W. Bonaley . . .		23 12 0	25 0	July	15 2 0	20 0	
1803	Woodford . . .		22 10 0	21 0		7 0 30	12 20	{ Had light N.W. airs and calms, then S.W. winds.
1804	Asia . . .		15 8 30	23 0	June	24 5 0	21 0	Southerly and variable light airs.
	Bengal . . .		16 8 0	23 40		24 3 30	22 30	Variable.
1792	Earl Talbot . . .	July	9 13 0	24 0	July	20 4 0	22 30	Southerly.
1794	Sir Edward Hughes . . .		23 10 0	22 0	Aug.	2 4 0	20 0	S.S.W.

Year.	Outward-Bound Ships.	Lost N.E. Trade.			S.E. Trade began.			Winds, &c. between the Trades.
		Month.	Lat.	Lon.	Month.	Lat.	Lon.	
1795	Cirencester .	July	31 14 0 N.	26 0 W.	Aug.	15 3 30 N.	22 0 W.	S.S. Westerly.
1796	True Briton .		17 17 0	25 30		16 2 0 S.	8 0	S.W. to S. by W.
1797	Queen .		5 8 30	22 30	July	20 2 30 N.	24 30	Southerly.
1798	Osterley .		1 9 30	25 0		11 2 0	25 0	
1799	Woodford .		12 9 0	23 0		20 2 40	15 0	S. Westerly.
1800	Earl Spencer .		28 16 30	26 0	Sept.	23 13 0 S.	5 0 E.	{ S.W. light winds and calms. Crossed equator 2° E. Aug. 26.
1801	Minorca .		18 15 0	26 0	Aug.	8 3 0 N.	24 0 W.	Variable and Southerly.
1802	Lord Eldon .		11 11 30	23 0		24 9 0 S.	1 0 E.	{ S.W. winds. Crossed equator in 4° E. July 30th. S.W. and S.S.W. winds continued.
	Minerva .		7 13 0	19 30		15 9 30	5 0	{ S.W. and S.S.W. winds. Crossed equator July 25, in 4° E.
	Travers .		9 13 0	25 0	July	24 2 0 N.	22 30 W.	S.S.W. and S.W.
1803	Essex .		29 13 30	27 0	Aug.	11 3 0	19 0	S. Westerly.
	Princess Mary .		28 14 30	27 0		13 0 54	22 20	S. and Westerly.
1804	Arniston .		14 12 0	26 0	July	27 4 0	22 0	
	Lord Eldon .		31 8 0	21 0	Aug.	8 4 30	22 0	S.W. and Southerly.
1798	Earl Fitzwilliam	Aug.	1 12 30	25 0		14 2 30	17 0	
1802	Skelton Castle .		10 16 0	25 0	Sept.	24 9 0 S.	9 0 E.	{ S.W. on both sides of equator; crossed Greenwich meridian Sept. 7.
1803	Northampton .		9 11 30	25 0		1 2 30 N.	25 0 W.	S.W. and Southerly.
	Ann .		8 13 0	25 0	Aug.	31 4 0	23 0	
	General Stewart		16 14 0	27 0	Sept.	10 1 0	27 0	
1804	Monarch .		7 13 0	25 0	Aug.	24 1 0	13 0	S.W. and variable.
1794	Dart .	Sept.	26 9 0	21 0	Oct.	6 1 0	13 0	
1796	Carnatio .		5 11 0	23 0		10 11 30 S.	7 0 E.	{ S.W. and S. Crossed equator 17th Sept. in 5° W.
	Queen .		5 11 0	23 0		9 8 0 N.	3 0	{ S.W. and S. Crossed equator in 3° E., and saw Anno-Bom 25th
1798	Georgina .		13 13 0	18 0		18 8 0	7 0	{ S.W., saw St. Thomas Oct. 1; and next day Coast of Africa.
1799	Swallow .		29 12 0	19 0		12 3 30	23 30 W.	S.W. and variable.
1801	Elizabeth .		9 15 0	27 0	Sept.	24 2 0	19 0	
1803	Georgina .		28 10 30	23 30	Oct.	12 1 30	23 0	Variable.
1797	Henry Dundas .	Oct.	20 14 0	25 0		30 5 0	26 0	Southerly and variable.
1800	Georgina .		16 8 0	23 0		20 4 0	24 30	Variable.
	Prince Wm. Henry		18 7 0	24 0		24 3 0	24 0	
1801	Princess Mary .		9 12 0	26 0		30 1 0 S.	19 0	Southerly and faint airs.
1804	Ocean .		18 8 0	22 0	Nov.	4 3 0 N.	18 0	Calms and S.S.W. faint airs.
1806	Diana .		29 8 30	21 0		9 3 0	22 30	Variable.
	Europe .		16 11 0	28 0	Oct.	26 4 0	29 0	Southerly and variable.
1792	Hindustan .	Nov.	10 10 30	22 30	Nov.	15 5 0	22 30	Variable.
	Swallow .		27 6 0	21 0	Dec.	1 4 30	21 0	
1796	Bellona .		13 5 0	27 0	Nov.	13 5 0	27 0	Wind fresh at E.; gradually to S.E.
1798	Cuffnells .		5 9 30	25 0		19 4 0	23 30	
	Sarah Christiana		15 8 40	25 40		26 4 40	25 0	Southerly and variable.
1803	Lord Duncan .		10 9 0	23 0		15 4 0	22 0	Easterly and variable.
1808	{ Britannia .		25 18 0	20 0	Feb.	1 7 0 S.	1 0	{ Calms and S.S.W. airs near Coast of Africa, and in general
1793	Lascelles .	Mar.	10 1 40 S.	19 0	Mar.	23 5 0	21 0 E.	Variable.
1797	Swallow .		27 1 30	19 0	Apr.	7 3 30	22 0	
1803	Cirencester .		11 1 0 N.	22 0	Mar.	16 2 0	25 0	Northerly and variable.
	Lady Jane Dundas		19 1 0 S.	16 0	Apr.	1 5 30	21 0	
	Tellocherry .		18 1 10	21 0	Mar.	27 4 40	22 40	
1804	Lord Duncan .		8 1 40 N.	23 0		8 1 50	23 0	No light winds between Trades.
	Huddart .		22 1 0	15 0	Apr.	6 8 0	19 0	Light and variable.
	Waller Brigg .		28 2 0	21 0	Mar.	30 8 0	21 0	Light winds one day.
1798	Thetis .	Apr.	22 1 0	23 0	May	8 6 0	27 30	Northerly.
1800	Sir Edward Hughes		9 1 0 S.	22 0	Apr.	15 4 0	25 30	Variable.
1802	Lord Duncan .		28 1 0 N.	20 0	May	5 5 0	21 0	
1803	Canton .		13 3 0 S.	21 0	Apr.	20 4 0	25 0	
	Lord St. Vincent		7 1 0 N.	22 0		14 4 20	26 0	Variable.
1804	Earl Howe .		12 2 30	20 0		16 6 0	20 0	

Year.	Homeward-Bound Ships.	Lost S.E. Trade.			N.E. Trade began.			Winds, &c., between the Trades.
		Month.	Lat.	Lon.	Month.	Lat.	Lon.	
			° ' "	° ' "		° ' "	° ' "	
1804	Charlton . .	Apr.	12 1 20 N.	19 30 W.	Apr.	17 6 0 N.	24 0 W.	
1793	Melville Castle .	May	4 0 30	22 0	May	11 7 0	22 30	
1798	Rose . .		13 4 0	23 30		16 7 0	25 0	Southerly.
	Marq. Lansdowne		14 4 30	22 30		16 7 0	24 0	
	Admiral Gardner		24 2 30	22 0		31 7 0	25 0	Southerly and variable.
1800	Taunton Castle .		4 2 30	23 30		9 4 0	25 0	
	Manship . .		16 1 0	20 0		22 6 0	20 0	
1801	Lord Nelson . .		5 3 30	24 0		6 4 30	25 0	
1802	Royal Admiral . .		23 5 0	26 0		23 5 0	26 0	No light winds.
1792	Kent . .	June	2 1 0	22 0	June	9 8 30	24 30	Southerly and variable.
1794	Northumberland		2 3 0	21 0		17 12 0	21 0	Variable and calms.
1796	Carron . .		11 0 30	17 50		19 9 0	17 40	
1798	Sir Edward Hughes		12 1 30	19 30		24 12 0	25 0	
1799	Bridgewater . .		11 2 30	24 0		18 8 40	25 0	
1800	Woodford . .		7 1 30	23 0		17 8 30	26 0	
	Karl Howe . .		29 5 30	21 0	July	16 15 0	26 0	Variable.
1803	Marquis Wallasey		1 3 40	22 0	June	7 8 0	22 30	
	Lord Nelson . .		29 6 40 S.	15 0	July	16 11 0	27 0	Easterly to 1° N. 23° W. July 6.
	Cuffnells . .		2 2 0 N.	23 0	June	7 7 0	23 0	Southerly.
	Fame . .		22 5 0	23 0	July	2 12 0	26 0	Southerly and variable.
	Sir W. Bensley .		10 5 0	24 0	June	15 9 0	25 0	
	Dover Castle .		5 4 30	22 0		14 10 0	22 0	
1806	Walpole . .		4 4 0	21 0		9 7 30	21 0	
1798	Bellmont . .	July	5 5 0	22 0	July	15 11 30	24 0	
1794	Exeter . .		14 4 0	25 0		30 14 30	28 0	Variable and Northerly.
1795	Lord Hawkesbury		13 0 0	21 0	Aug.	1 11 40	27 0	
1799	Tellicherry . .		18 4 0	17 0	July	29 13 0	27 0	
	Sarah Christiansa		28 4 0	23 0	Aug.	6 14 40	25 30	S.W. and Westerly.
1802	Karl Mornington		9 1 30	20 0	July	16 13 30	26 0	S.W. and Westerly.
1804	Abergavenny . .		2 6 0	21 0		8 12 0	24 0	S.W. and variable.
	Sir Wm. Pulteney		22 10 0	23 0		26 13 0	26 0	Variable.
1805	Arniston . .		25 4 40	22 0	Aug.	7 14 0	26 0	S.W. and variable.
1793	Karl Talbot . .	Aug.	14 3 0	22 0		22 14 0	26 0	
1796	Queen . .		22 3 0	25 0	Sept.	1 17 0	27 0	S.W. brisk winds.
1802	Abergavenny . .		2 5 0	24 0	Aug.	9 13 0	28 0	S.W. and variable.
1803	Travers . .		12 5 0	26 0		18 13 0	28 0	
1804	General Stewart		26 5 0	21 0	Sept.	6 16 0	27 0	
1795	Duke of Buccleugh	Sept.	17 2 30	24 30		24 11 30	26 0	
1797	Malabar . .		4 4 0	21 0		18 13 30	28 0	Variable.
1801	Anna . .		15 4 0	22 40		29 13 30	27 30	
1802	Princess Charlotte		18 3 30	19 40		24 11 0	23 0	South Westerly.
1804	Preston . .		23 3 0	24 0	Oct.	1 12 0	25 0	Variable light winds.
1796	Cirencester . .	Oct.	5 4 30	25 0		12 8 30	26 0	
1801	Hugh Inglis . .		20 2 30 S.	17 0	Nov.	2 10 0	25 0	
1802	Princess Mary . .		7 3 0 N.	22 0	Oct.	20 16 0	23 0	
1803	Minerva . .		6 2 0	22 0		14 10 30	22 30	
	Experiment . .	Nov.	30 3 0	21 34	Dec.	7 7 0	21 40	
1804	Princess Mary .		20 3 40	23 0	Nov.	23 7 0	23 30	
1793	Swallow . .	Dec.	23 1 0	18 0	Jan.	5 6 0	19 0	
1796	Nancy . .		25 3 0	19 30	Dec.	29 6 0	21 0	
1796	Karl Fitzwilliam		23 1 0	21 0		27 4 0	22 30	
1797	Carnatic . .		25 2 0	22 30		26 3 0	22 0	Southerly
1798	Hawke . .		19 2 30	21 30		23 5 0	23 0	Variable.
1801	Travers . .		5 4 0	26 0		6 5 0	26 30	
1804	Ann . .		20 1 0	23 0		27 5 0	25 0	Calms and faint breezes.
1806	Northampton .		14 2 30	20 0		20 6 0	21 0	Variable and light winds.

Observations for some months are rather too few to obtain a correct mean: but the first column showing *extreme limits* in the following Abstract, will be useful, as it marks where the Trades may be expected to fail or commence.

ABSTRACT OF THE FOREGOING TABLE,

Of Equatorial Limits of the Trades, between 18° and 26° W. Lon., exclusive of those Ships which made the Eastern Passage to St. Helena.

Months.	Lost N.E. Trade Outward, in		N.E. Trade began Homeward, in		Mean Out and Home.	Lost S.E. Trade Homeward, in		S.E. Trade began Outward, in		Mean Out and Home.	Diff. of the Mean Limit of N.E. and S.E. Trades.
	Lat.	Mean.	Lat.	Mean.		Lat.	Mean.	Lat.	Mean.		
Jan.	5 to 10 N.	7 N.	3 to 6 N.	4½ N.	5½ N.	1 to 4 N.	2½ N.	2 to 4 N.	3 N.	2½	3
Feb.	5 10	7	2 7	5	6	2 S. to 8	1½	1 1	1	1½	4½
March	2½ 8	5½	2 7	5	5½	1 2	1	1 2½	1½	1½	3½
April	4 9	6	4 8	5½	5½	2 2½	1	0 2½	1½	1½	4½
May	5 10	7	4½ 7	6	6½	1 N. to 4	2½	0 4	3	2½	3½
June	7 13	10	7 12	9	9½	1 5	3	0 5	3	3	6
July	8½ 15	12	11 14	12	12	1 6	4	1 5	3	3½	8½
August	11 15	13	11 14½	13	13	3 5	4	1 4	2½	3½	9½
Sept.	9 14	11½	11 14	12	11½	2 4	3½	1 3	2	3	8½
Oct.	7½ 13	10	8½ 14	10	10	2 5	3	1 5	3	3	7
Nov.	6 11	9	7 0	7	8	3 4	3½	3 5	4	3½	4½
Dec.	5 7	6	3 6	5	5½	1 4	2½	1 4½	4	3½	2½

The numbers in this last column show the space of variable winds, &c. between the limits of the Trades. The columns of means do not always exhibit the exact means of the two extremes for each month, but these mean numbers incline a little from true mean, towards the extreme limit experienced by the majority of ships.

A Treatise on Winds, printed in 1675, by John Seller, Hydrographer to the King, reprinted by Dalrymple in 1807, agrees nearly with the above abstract; and remarks as follows:—

"In January, February, and March, the N.E. trade wind bloweth commonly unto 4° N. lat., where at that time beginneth the S.E. and easterly trade wind. In April, the N.E. trade wind bloweth commonly unto 5° N. lat., where then beginneth the S.E. wind. In May, the N.E. trade wind bloweth unto 6° N. lat., where at that time beginneth the S.E. wind, somewhat more southerly. In June, the N.E. trade wind bloweth unto 8° N. lat., where then beginneth the southerly wind. In July, the N.E. trade wind bloweth unto 10° N. lat., where then beginneth the southerly wind, somewhat westerly. In August, the N.E. trade wind bloweth unto 11° N. lat., where the southerly wind begins, somewhat westerly. In September, the N.E. trade wind bloweth unto 10° N. lat., where the southerly wind beginneth. In October, the N.E. trade wind bloweth unto 8° N. lat., where then the southerly wind beginneth, somewhat easterly. In November, the N.E. trade wind bloweth unto 6° N. lat., where the S.E. wind beginneth. In December, the N.E. trade wind bloweth unto 5° N. lat., where the S.E. wind beginneth. It is to be observed, that between the N.E. and S.E. trades, the winds are subject to alteration, which variableness is sometimes found a degree or two sooner or later than the aforesaid latitude: and the more northerly you are, the more is the variableness found to be about the N. and the N.E.; and the more southerly you are, the more are the winds found to blow about the S.E. and the S."

This observation is partly correct; but it is generally experienced that the S. winds prevail more than any other throughout the whole space of variable winds between the trades, more particularly when the sun has great N. declination; *then*, and generally at all seasons, homeward-bound ships are enabled to cross this space more quickly than ships outward-bound. Calms and variable winds are also experienced during every month, in the space between the trades: the former seldom continue long, and the vicinity of the N.E. trade seems most liable to them. These calms are often followed by sudden squalls, occasionally accompanied by lightning; these ought to be watched with great care, and sail quickly reduced when their approach is perceived; for many East India ships lose topmasts and sustain other damage by these equatorial squalls, which give very little warning. They are sometimes accompanied by whirlwinds, and may blow strong for an hour or two; but a gale of wind, or storm of much duration, *probably* never happens far from land near the equator in open ocean; although, near the line, sudden gusts of wind and whirlwinds are experienced at times.

S.W. and W.S.W. winds with much rain often prevail in July, August, and sometimes in June and September, blowing to the coast of Guinea, and sometimes as far N. as Cape Verde Islands; these are called the *Line Westerly Monsoon*, by navigators trading to the Gulf of Guinea.

CHAPTER IV.

ISLANDS AND DANGERS IN THE SOUTH ATLANTIC.

ST. PAUL ROCKS—FERNANDO NORONHA—TRINIDAD—ASCENSION—ST. HELENA—BRAZIL COAST—
PERNAMBUCO—BAHIA—ABROLHOS—RIO JANEIRO.

(VARIATION AT FERNANDO NORONHA, 13° W.; AT ASCENSION 22° W.; AT ST. HELENA 25° W.)

Winds and Currents.—Many journals seem to prove that the N.E. trade wind is deflected by the projection of Cape Verde, and that ships which keep near the coast of Africa lose the trade sooner than others which are farther from the coast. To guard against this, some commanders recommend to keep well to the W. at the time the N.E. trade fails, with a view to retain it longer, to have fewer calms and baffling winds in the variable space, and to meet the S.E. trade wind sooner than if more E. By adhering to this, several ships have crossed the Equator far West; then, meeting with the S.E. trade hanging far from the S., with strong W. currents, have made the Brazil coast about Cape Roque: or sometimes farther to the W., which greatly prolonged their voyage. In the summer months, when the sun is in the N. hemisphere, outward-bound ships should not run too far to the W., for, in this season, it has sometimes happened that the N.E. winds have continued longer with ships in lon. 19° to 23° W., than with others which had separated from them, and lost the trade in 26° and 27° W. longitude. On whatever side the Cape de Verde Islands are passed, the most eligible position at losing the N.E. trade is *probably* from lon. 18° to 23° W., especially for a steam vessel, which should shape her course to pass E. of those islands. When the sun is near the N. tropic, the trade wind often fails ships near or in sight of these islands; it is certainly best to pass to the W. of them at such times, 8 or 10 leagues at least, to preserve the steady wind, and prevent delay, as light eddy winds prevail near and amongst them in this season. When to the S. of the Cape de Verde Islands, steer to the S.E., if wind permit, and endeavour to get into lon. 18° to 23° W. at losing the N.E. trade. If then the S. winds commence, take advantage of the shifts to stand on the tack which gains most southing, and endeavour to cross the equator from 18° to 23° W., if the winds admit; but do not be induced to make a long tack either E. or W., with a dead S. wind, in hopes of meeting a better, unless it veer so far as to gain much southing. From a summary of passages made by the packets sailing from Falmouth, it is considered most advisable to keep on the Port Tack even should the vessel fall off to W. by S., as by the experience of the late Commander William Green, R.N., the wind will draw more to the E. as she advances. The S.E. trade generally, at its N. limit, inclines from S., particularly in July, August, and September; and the same has been known in other months. When a ship meets this trade, she should not be kept too close to the wind, making little progress, but be kept clean full, to enable her to make good way through the water to the S.W.; thus she will soon get to the S. of the limits of the W. current which prevails about the equator and to lat. 4° or 5° N.: also extending to lat. 3° or 4° S. about Fernando Noronha; and from about lon. 27° W. to Cape Roque it runs very strong, particularly from September to March. In proceeding to the S., the wind will draw more to the S.E., and finally to E. and E.N.E. at the S. limit of the trade. In winter, the currents from the Cape de Verde Islands sometimes set E. and sometimes W. to 4° or 5° N. lat., at other times they are variable; but to the S. of lat. 3° or 4° N., and W. of lon. 20° or 22° W., the equatorial current perpetually runs to the W.

Warley Bank (7 fathoms) is *very doubtful*, in lat. $5^{\circ} 4' N.$, lon. $21^{\circ} 26' W.$ Deep soundings of over 2000 fathoms have been taken not far from this position.

ST. PAUL ROCKS, or Penédo de San Pedro, in lat. $0^{\circ} 55' N.$, lon. $29^{\circ} 22' W.$, elevated 64 ft. above the sea, consists of a group of several rocks adjoining each other, with soundings of 80 to 80 fathoms near them. Admiral Fitz Roy, who visited these rocks in Feb., 1832, concluded that it is unconnected with any shoal, but merely the summit of a steep-sided mountain rising from the bottom of the ocean. A line of 2000 fathoms failed to reach bottom at a few miles to S. of them. There was a slight current setting to the W. not amounting to 1 m. an hour. This rocky isle has

been seen by several ships both outward and homeward bound, although it is considerably to the W. of the common route of the latter. The variation at St. Paul was $15\frac{1}{2}^{\circ}$ W. The Russian vessel of war *Passodnik* and the *Sea-Serpent* are said to have struck on a coral reef in lat. $0^{\circ} 35' N.$, lon. $28^{\circ} 10' W.$, also that another reef lies about 9 leagues S.W. by S. from the above Rocks.

FERNANDO NORONHA, which consists of one large and several small islands, has sometimes been visited or seen by ships bound to India, carried by currents to the W., after failure of the N.E. trade. Fernando Noronha is a penal settlement of Brazil, and well defended by forts. It is hilly, uneven land, and may be seen 10 leagues in clear weather. The principal S.W. island has a high peak, called the Pyramid, about 800 ft. high, very remarkable, seeming to lean or overhang to the E. when it bears S.S.W. The S.W. point has off it a sunken rock, dangerous to approach. From the S.E. part of the island a reef extends, and some sunken rocks at a league from shore. There is also said to be a reef, on which the sea always breaks, about 2 m. from the E. part of the island, with a channel of 10 or 15 fathoms within it. The group extends nearly 7 m. about S.W. and N.E., and is less than 2 m. broad; the shores are rocky, and surf frequently high: at such times there is no safe landing. **Rollers** occur here in winter and spring; they are the undulation of the ocean after a N.W. gale in the North Atlantic.

It is not advisable to touch at this island, except in necessity; for water is scarce in the dry season, and cannot always be got off from shore, on account of surf. The well which supplies ships with water is near the governor's house, but landing casks and getting off water is inconvenient. There is little rain; sometimes two years have passed without any, the rivulets being dried up, and vegetation parched. Wood is cut on a little island near the N. point of the large one, but is not conveniently got into boats, on account of the rocky shore. The currents run strong to the W. about Fernando Noronha; therefore, ships intending to anchor here should always pass round the N. end of the island.

Anchorage is good in 13 fathoms, finewhite sand, on the N. side of the group, off shore about 1 m., with Fort St. Antonio E. by S. $\frac{1}{4}$ S., Fort Remedios S. by W., Fort Concepção S.S.W. $\frac{1}{4}$ W. Pyramid S.W. $\frac{1}{4}$ S. The road of Fernando Noronha is unsafe to lie in with N. or N.W. winds, said to prevail from Dec. to April; at other times, they are mostly S.E. or E., and sometimes N.E. The Pyramid is in lat. $3^{\circ} 51' S.$, and in lon. $32^{\circ} 26' W.$

Tides rise about 6 ft., and it flows to 4 hours on F. and C. of moon. Variation 13° W.

LAS ROCAS are low and dangerous, sandy hummocks, from 4 to 10 ft. in height, with a rocky islet off the E. part about 12 ft. high; a reef encircles them, partly dry at low water: they are 4 m. in extent E. and W., by $2\frac{1}{4}$ m. N. and S. Fresh water was found near a hut on Santa Maria or N. Sand Bank. A beacon has been erected on the W. island, upper part White, lower Black, in lat. $3^{\circ} 52' S.$, lon. $33^{\circ} 47' W.$ On the W. side fish of excellent quality abound.

Tides.—H. W. F. and C. about 5h.; rise from 6 to 10 ft. Variation $10\frac{1}{4}^{\circ}$ W. Ships which pass between Fernando Noronha and the Brazil coast, should be cautious in the night, if not certain of their position; for the strong W. currents are liable to sweep them to leeward, and the distance between Las Rocas and Fernando Noronha is variously stated as 26 or 28 leagues.

MARTIN VAS ROCKS are high and barren (300 ft.); the central one largest, and seen from a ship's poop at 10 leagues: they are nearly all in one when bearing S. or N. The N. and central rocks are near each other, but between the latter and the S. one there is a channel, through which the *Chesterfield* passed, but it had better be avoided. Captain Mallors, of the ship *Rose*, in July, 1833, discovered a sunken rock, bearing N.E. from the largest Martin Vas, about $2\frac{1}{4}$ m., to which a boat was sent, and found a breaker when passing over it. The N. rock is small; and the distance between the two extremes is about 3 m.; they are all steep and inaccessible. The breadth of channel between these rocks and Trinidad Island is about $8\frac{1}{4}$ leagues. The central Martin Vas Rock is in lat. $20^{\circ} 28' S.$, lon. $28^{\circ} 51' W.$

TRINIDAD is less than one league long, to S.E. and N.W.; and two-thirds as broad; 2,000 ft. high and uneven; seen from a ship's poop in clear weather at 15 leagues. It is rocky, and in general barren; on some heights, particularly about the S. part of the island, there are trees about 12 or 18 inches diameter. The shore is rocky and difficult of access, the high surf continually breaking on it in every part. On the W. side, there is a rock about 850 ft. high, with trees on it, called the Monument, or Nine-pin. There is also a bluff rock, about 800 ft. high through which there is an arched passage, 40 ft. broad, 50 ft. high, and 420 ft. long: the sea breaks through the arch with great noise; it has a depth of three fathoms, and so has the basin at its E. side. At the S.E. end of the island is a conical rock, about 1,160 ft. high, called Sugar Loaf, with trees on its summit; whenever it rains hard, a waterfall of above 700 ft. is projected from it.

At the E. and S.W. sides of the island, good water runs down, in two small streams; it may also be procured at times from the rock that forms the S.W. extreme; but, excepting when rain

prevails, these *runs* are very small, and probably they may in some seasons be dried up. Ships should not stop at this island for water, unless greatly in want, for difficulty is found in getting it from shore; the anchorage is also unsafe, as winds are often variable, and if a gale happen from W. or S.W., there is danger of driving on shore. This insecurity deters ships from visiting the island, although they often see it in passing to the S. through the S.E. trade. Although Trinidad is within the S. tropic, the S.E. trade wind is not regular there; frequent N.E. and also W. gales happen; and sometimes hard squalls or S.W. gales, which render the anchorage hazardous.

Ships touching at Trinidad, to procure water, should anchor in 30 fathoms, about 1 m. from the W. part of the island, that they may be able to clear it on either tack, should the wind blow from the W.; for the *Rattlesnake* was wrecked in a W. gale, and the *Jupiter* and *Mercury* narrowly escaped destruction. There seems great risk in attempting to land, and bring off water, on account of the swell, even in fine weather.

The S. end of Trinidad Island is in lat. $20^{\circ} 31' S.$, and in lon. $29^{\circ} 20' W.$ Variation $12^{\circ} W.$

From the Equator to Ascension.—Some outward-bound East-India ships, after crossing the equator, have found the S.E. trade far to the E., which enabled them to pass in sight of Ascension Island; this can only happen to ships which cross the equator far E. of the common track, when the sun is near the S. tropic. The trade wind may then veer to E. by S. or E.; and at such times, a S. course may probably be made, by keeping close to the wind in crossing the trade; although ships bound to India, or the Cape of Good Hope, should not adopt this route with a view of shortening the distance; for their object is to get quickly through it, into the N. and W. winds, where they will soon run down the longitude.

Although Ascension is seldom seen by ships bound to India, those homeward bound generally see it in passing: particularly in times of peace, when no danger is apprehended from cruisers.

ASCENSION ISLAND about 8 m. in length from E. to W. and 6 m. broad from N. to S., having several peaked hills, may be seen 15 leagues or more, in clear weather. Green Mountain, the highest, situated near the S.E. part of the island, is 2,800 ft. high, and appears a double peak in some views. Most of the hills are covered with red earth, like brick-dust, the island being a volcanic rock.

Since the time that Bonaparte was sent to St. Helena, a British naval force has been placed at Ascension, and it is now the rendezvous of the African squadron. It has been found a healthy island, and a valuable dépôt for provisions, which this dry atmosphere preserves; whereas, on the coast of Guinea, all kinds of provisions soon become corrupted. Some small springs have been found, and water is now conducted in iron pipes to the garrison; it can be procured from tanks on application to the harbour-master. Vegetables of various kinds are procurable. The wild goats are lean; rats and mice abound; and there are few insects. The summit of the mountain is frequently enveloped in clouds or vapour, but rain seldom falls. Turtles are still plentiful in sandy bays and coves, but any person found taking them on the beach, or when floating near the island, is liable to a penalty of £25; they may be purchased for £2 10s. each. Sheep and goats are becoming scarce.

A ship intending to stop at Ascension should steer round the N. point of the island, a low rocky point, with foul ground 2 cables off it. Caution should be observed in passing it: for a large Dutch merchant ship struck on the rocks off this point in 1839, and unshipped her rudder; she sank a few hours afterwards. When past this point, Sandy or Clarence Bay will soon be seen to the S.W.; a small bay, with a white sandy beach, having a hill like a dome a little distance inland. This hill had formerly a cross, but now a flagstaff, whence it is called Cross or Flagstaff Hill. From the W. point of Clarence Bay, a reef of rocks projects about $1\frac{1}{2}$ m., on which the sea breaks when there is much swell; at other times there are no breakers.

A ship having passed the N. point of the island, should haul up into Clarence Bay, and anchor abreast the sandy beach, in 15 or 16 fathoms, sandy bottom, with Cross Hill S.S.E. off shore about $\frac{1}{2}$ m. There is now a mooring-buoy in the centre of the bay in 9 fathoms; also a beacon-buoy $\frac{1}{2}$ m. W.N.W. of Fort Thornton, outside the shoals and rocky ground, fronting George Town; and a chequered buoy about $\frac{1}{4}$ m. N.W. of the fort, as guides into the bay. Vessels should not anchor to the S. of these buoys, in consequence of the rollers (which break very heavily at times) and of the shoals and rocky ground off shore between Fort Thornton and Catherine Point. The landing-place called Tartar Stairs is at a jetty behind Tartar Rock, close on the W. side of Fort Thornton, situated on a prominence on the W. side of Clarence Bay. This rock makes a sort of division between Clarence Bay and the bay to the W., fronting George Town. Although the anchorage is to leeward, at the N.W. part of the island, there is often a high surf on the shore; caution is therefore requisite, as many ships have had their boats stove by the surf in landing. Along the N.W. side of the island, the bank of soundings extends about 2 m. off shore.

Fort Thornton is in lat. $7^{\circ} 55' S.$, lon. $14^{\circ} 25\frac{1}{4}' W.$ Variation in 1872 is $22^{\circ} W.$ A Time-ball was dropped from a staff at Hayes Hill 110 ft. high) at 8 h. a.m., and 1 h. p.m. of Ascension, mean time. The longitude of the flag-staff is assumed to be $14^{\circ} 25\frac{1}{4}' W.$; or 57 m. 42 s. W. of Greenwich. Vessels not intending to remain for the usual time of showing the signal, may have the ball dropped at any convenient hour of Greenwich time by a request being made at the master's office.

Tides.—There is very little rise or fall; greatest rise, 2 ft.; H.W. at F. and C. at $5\frac{1}{4}$ hours.

ST. HELENA ISLAND lies in the strength of the S.E. trade. There can be little danger of missing it, although this has sometimes happened, the body and leeward part being frequently enveloped in fog clouds, particularly at night. If a ship should fall a *little* to leeward, she can easily work up to the anchorage, unless she sail badly upon a wind. Current seldom runs *strong* to leeward near this island; except when the trade wind blows strong with squalls, for a few days, which occurs sometimes about the F. and C. of moon; but this lee current is generally of short continuance. In times of war, when an enemy's cruisers visited St. Helena, they kept to the E. and S.E. of it, 15, 20, and 25 leagues off. A ship which sails well would avoid these cruisers, were she to make the island bearing from N.N.E. to E. or S.E., and afterwards make short tacks under the lee of it, till the anchorage is reached. Store ships from England have made the island bearing E.S.E. directly to windward of them, 15 or 18 leagues off; they sailed indifferently, but reached anchorage the third day after sighting the island. There are sometimes calms near it.

This island is about 3 leagues in extent, N.E. and S.W., of an oblong square form, about 27 m. round. The steep rocky cliffs facing the sea present a sterile appearance to an observer in sailing round the E. part of the island; but the chasms or valleys, and likewise the hills, are fruitful, and clothed with verdure, except in very dry seasons, when it is sometimes parched up. The highest part of the principal ridge of mountains in centre of the island, called Diana Peak, is about 2,700 ft. high. Nearer the S.W. part, there is a conical hill, called High Peak, nearly as high.

Weather. On these hills, and on high grounds, the air is always cool and pleasant; fog clouds frequently cover the Peaked Hills, or driven by the trade wind, strike against them, producing gentle showers, which quicken the vegetation and cool the atmosphere on the high grounds, although in valleys on the leeward side the sun is often powerful. There is very little level ground on this island: the abrupt ridges and chasms into which it is split seem to prove its volcanic origin. Thunder is seldom heard at St. Helena; lightning has been at times observed in cloudy weather, with a sultry atmosphere; showers of rain come in all seasons, but in some months more than others.

Barn Point, the N.E. extremity of the island, has a pyramidal hill close to the sea, called Sugar Loaf, with a signal-post on it. At the base of this hill there are three batteries, called Buttermilk, and Banks Upper and Lower Batteries; a little to the S.W. of these, Rupert Battery, mounted with heavy cannon, appears at the bottom of Rupert Valley; Munden Point divides this from James or Chapel Valley, where James Town is situated. Munden Fort (on a point of that name) is strong, and with several guns placed on the heights over it, commands that side of James Valley; on the S.W. side of this a hill rises nearly 800 ft. perpendicular from the sea, called Ladder Hill, with a heavy battery of guns, that commands the S.W. entrance to the valley and the anchorage. James Valley is also protected by a wall, and a strong line of cannon at its entrance, close to the sea. There is a battery at Sandy Bay, on the S. side of the island, where boats might land when the surf is not great; but this, and the few places where landing is possible, are well protected by batteries or guns placed on the heights over them; and on the summits of hills there are convenient signal-posts all over the island, which communicate by telegraph with each other, and with the castle.

All round the island there are soundings of 15 or 20 fathoms very near the shore, deepening quickly to 150 or 200 fathoms, about 1 m. off in most places, then no ground; but to S.S.W. from the S. point of the island. An uneven, rocky bank, called **Speery Ledge**, with only 3 fathoms in some places, projects about 2 m., with 25 and 35 fathoms between it and the S. point, the passage being nearly 1 m. wide. This, the only danger at a distance off the island, is not in the way of ships, unless they fall to leeward and round the S. point; in such case, they should give it a berth of 2 m., till it bear about N.E., then haul up for the S.W. or W. point, which is bold to approach. **Barn Ledge** is about $1\frac{1}{4}$ cables' length in circuit, with 12, 8, and 6 to 3 fathoms on it, sharp rocks on the shoalest parts; it lies $\frac{1}{4}$ m. to S.E. of Barn Point, and there are 24 and 20 fathoms between it and shore, with 32 fathoms near it on the outside.

Directions. Large ships coming from S.E. should keep the small islet, called George Island, well open with Saddle Point, until Sugar Loaf Point is open with Barn Point, which will carry them clear outside of the ledge; or keep a mile from shore till nearly abreast of Barn Point, the N.E. part of the island, and pass within a cable's length, or less, of Sugar Loaf Point: she should after-

wards keep the shore close a-board in passing Rupert Valley, with the head-sails braced well forward, as the gusts of wind from high land veer several points, and may take the sails aback, if precaution is not used. When past Rupert Valley, Munden Point ought also to be kept pretty close; but care must be taken to avoid the *sunken* rock lying off the fort, about 30 or 40 yards from the point, on which, by borrowing close to the shore, the *Lascelles*, *Fox*, and other ships struck, and were nearly lost. For several years past there has been a small buoy with a red flag placed over this rock. When Munden Point is passed, James Valley and Town appear, off which is the proper anchorage.

Abreast of James Valley, the anchor may be dropped in from 8 to 15 fathoms, with the flag-staff on castle in James Town S.S.E. or S.E. by S. The anchorage is equally good off the E. corner of Ladder Hill, or abreast of it, with the flag-staff about E.S.E. If a ship anchor in less than 14 fathoms off Ladder Hill, she should be kept at a short scope of cable, till a kedge or stream anchor is laid out in the offing to moor by; for light eddy winds and calms prevail under the hill: she may therefore be liable to swing with stern in shore, and tail on the rocks, if there is much cable out. In weighing from under the hill, the inner anchor must be first taken up, to prevent tailing on the rocks.

Ships generally moor with a stream or kedge anchor to the offing, and sometimes with a bower anchor; those in the stream of the valley seldom swing with their sterns towards it; for a continued breeze, and frequent gusts of wind, blow from it to seaward.

If a ship anchor in 35 or 40 fathoms water, and the anchor does not hold, all the cable may be veered out, to make her ride, if possible, till convenient to warp further in; but do not let go a second anchor, for if she will not bring up with one, it ought to be hove up; then make sail to work her in by short tacks, under lee of the island, till she gain proper anchorage nearer the shore.

When the wind is light, the ships swing with their heads alternately to the E. and W. at times, this being the effect of a current, or sort of tide; but this tide is very weak, and the rise and fall on the shore at F. and C. of the moon is not more than 2 or 3 ft.

Lemon Valley, about 2 m. to S.W. of James Valley, has a run of good water in it; but it is difficult to water at this place, on account of the surf and rocky shore. Ships do not anchor off this valley, it being distant from the town. Abreast of Rupert Valley they sometimes anchor, but the ground is not so good as abreast of James Valley and Ladder Hill; here the bank extends about a mile from shore, shelving steeply outside of 40 fathoms. It is not prudent to anchor in deep water near the edge of the bank, for gusts of wind from the valley are liable to start the anchor when a ship lies far out; nor could it avail to let go another anchor, for the steepness of the bank would prevent it from taking hold of the ground. Several ships have driven off the bank with two anchors down, and all the cables veered out, which occasioned great exertion to recover them, and afterwards to work up to the anchorage.

James Town is in the entrance of the valley, and almost obscured by the impending rocky mountains enclosing it; a row of trees behind the ramparts, and another behind the governor's house, give it a pleasing appearance. The houses are neatly built on each side of the principal street, which lies in a direct line up the valley; higher up there is a long walk between two rows of trees, having an enclosed square on the left side, and terminated by a garden belonging to the Crown. One penny per ton is levied on all ships touching here in aid of the funds for erecting and maintaining the civil hospital and prison free of any other charge; the majority of patients are seamen of all nations. There is water in James Valley, from a spring, conveyed by pipes to the jetty, where are two cranes for the use of boats. Watercresses are often plentiful about the edges of this run of water, and are very serviceable to ships with scorbutic crews.

The water that supplies the garrison and shipping is conveyed by leaden pipes from a spring in the valley, distant more than 1 m. from the sea. These pipes lead the water to the jetty, which has two cranes for loading boats with goods or water-casks, or to receive stores from the shipping. Firewood cannot be had in sufficient quantity, furze being the principal fuel of the islanders, and brought from a great distance. Cabbages, potatoes, carrots, turnips, and other vegetables and fruits, thrive well, but are sold dear, and not in sufficient quantity to supply all the shipping which at times anchor here to procure water and refreshments. Cattle are reared for the use of ships, and supplied to them very sparingly when a fleet arrives, the quantity bred not being adequate to the demand: a greater number, it appears, cannot be reared, for in very dry seasons the pasturage has been sometimes destroyed, and numbers of the cattle died. Thus, although the island can support much cattle and they thrive here, yet the supply has to be kept up from the Cape of Good Hope. Fish abound upon the shores. Poultry is generally dear, and scarce. A few hogs may at times be obtained at a high price, which, with a few bushels of potatoes, are almost the only articles procurable when a fleet has recently departed, or is lying at the island. Most of the tropical fruits, as well as those found in Europe, thrive well in St. Helena. Apple-trees thrive in a

valley near the S.E. part of the island, in a remarkable manner. The gum-tree is the only one in the island that appears indigenous; several of these grow on the hills, and a copse of them is situated at the S.W. part of the island.

St. Helena Observatory is in lat. $15^{\circ} 55' 26''$ S., and lon. $5^{\circ} 43'$ W. Variation 25° W. We understand that the time signal for rating chronometers is still continued; a ball being dropped at the clockhouse, near Government House, at *Noon St. Helena Mean Time*, and also at *one o'clock Greenwich Mean Time*. The ball is hoisted half-mast at *five* minutes, and close up at *two* minutes before 12 o'clock.

PASSAGES TO AND FROM ST. HELENA.

From the passages of many ships by both E. and W. routes to St. Helena, compared with other information, it appears that the E. route may be adopted in Nov., Dec., Jan., Feb., and sometimes in March. If a ship bound to St. Helena, cross the equator in any of these months, and find the winds incline from the S.W., she may stand to S.E. across the Gulf of Guinea, close on a wind, and afterwards tacking as it veers to the E. or W. of South, she may reach St. Helena nearly as soon as if she had proceeded by the W. route. From the time of losing the N.E. trade, about 40 days to St. Helena may be considered a medium passage by the E. route in these months, but the *Swallow* made it in 31 days. When the sun has great N. declination, the E. route seems precarious; and the other is more certain at all times. The *Britannia's* passage of 95 days, and the *Vansittart's* of 92 days from England to St. Helena, in March, April, and May, by the E. route, were very tedious, and should warn others.

From the S. limit of the N.E. trade, the passage by the W. route is seldom accomplished in less than 40 days. The *Armiston* made it in 36 days in May, but she did not go more S. than lat. 25° S.; and the *Ceres* made it in 21 days from the equator, not going beyond lat. $22^{\circ} 15'$ S. It has been the practice with ships going the W. route to run far S., sometimes to lat. 32° and 33° S.: this can seldom be requisite, as it lengthens the passage. Ships which have proceeded no farther than the tropic of Capricorn, have generally made the best passages to St. Helena.

As St. Helena lies in the heart of the S.E. trade, the usual route from England is the beaten track by the Brazil coast, thence to the S. to about 24° or 25° S., and then to the E. on port tack till St. Helena bears N.N.E., when they may haul on the starboard tack for the island.

From St. Helena to England, the medium passage with a fleet is generally about two months or seven weeks in a single ship that sails well. From St. Helena to the Cape of Good Hope the passage is about a month. The *Georgina* was 26 days making it in Nov., in Feb. she was 28 days, and in April and May 32 days. From Cape of Good Hope to St. Helena, the passage may be estimated at 12 days; it is frequently performed in 10, and has been done in 8 days.

BRAZIL COAST.

(VARIATION AT ST. ROQUE, 13° W.; AT RIO JANEIRO, 3° W.)

CAPE ST. ROQUE is the name given in all the older charts to the N.E. point of Brazil; but the survey of Baron Roussin has shown that this name properly belongs to a less remarkable point, 25 m. further S., in lat. $5^{\circ} 28'$ N., lon. $35^{\circ} 16'$ W. The N.E. point of Brazil is Point Toiro, or Calcanhar, in lat. $5^{\circ} 8'$ N., lon. $35^{\circ} 29'$ W.

Between Cape St. Roque and Cape Ledo, the coast is generally lined by reefs, with soundings extending to a considerable distance; but near Cape Ledo the bank is rather more steep, although 10 and 12 fathoms are got with the cape bearing W., distant 10 or 12 m. Reefs project off this part of the coast, rendering caution indispensable when approaching it in the night.

Rio Grande do Norte, 6 leagues to S. of St. Roque, has a *fixed* light at Santos Reis Magos fortress, in lat. $5^{\circ} 45'$ S., lon. $35^{\circ} 13'$ W.; which is 43 ft. above H. W., and visible 4 leagues. The land in the vicinity is very low.

Pernambuco, in lat. $8^{\circ} 4'$ S., lon. $34^{\circ} 52'$ W., is a place of great trade, the port of Olinda, a small city on a small hill, with whitewashed churches and convents, which are visible at a considerable distance. A pilot is necessary to conduct a ship into this port. Large ships in want of refreshments may anchor in the road well out, and get the needful supplies; they must proceed to sea on the appearance of blowing weather. Ships should give Olinda Point a berth of at least 3 m., keeping in 10 fathoms, the reef in many parts being steep-to; there is a white buoy on

the S.E. edge of it. Coming from the S., Olinda Point should not be brought to the E. of N., till Fort Picaô bears N.W. by N. A striped red and white vertical buoy is placed on the N. side of the English Bank, and a red buoy with a bell on the S. end, distant nearly $\frac{1}{4}$ m. from each other.

Light. Pernambuco Light, in lat. $8^{\circ} 4' S.$, lon. $34^{\circ} 52' W.$, is *revolving* every minute, showing a white face twice, then a red face once, alternately. It is near Picaô Fort, and visible 15 m.

Cape St. Augustine, in lat. $8^{\circ} 21' S.$, and about lon. $34^{\circ} 56' W.$, is a ridge of high land projecting into the sea, having the fort N.S. de Nazareth on the summit of hill over the cape. From Cape St. Augustine, the coast takes a direction about S. by W. and then S.W. to the Reefs of St. Francisco. If a large ship make land about Capes Ledo or St. Augustine, it will be prudent not to approach under 25 or 30 fathoms in proceeding to the S. With due caution, the soundings are generally a sufficient guide.

Maceio light, in lat. $9^{\circ} 39' S.$, lon. $35^{\circ} 40' W.$, flashes every two minutes, being 208 ft. above H. W., and is visible 7 leagues.

San Francisco Light, in lat. $10^{\circ} 27' S.$, lon. $36^{\circ} 22' W.$, is a *fixed* light, on N. point of river, elevated 70 ft., and visible 11 m.

BAHIA DE TODOS OS SANTOS (Bay of All Saints), or Harbour of St. Salvador, is an extensive basin, bounded by the large island of Itaparica on the W. side, and on the E. side by the peninsula of St. Salvador. Cape St. Antonio, or Cape St. Salvador, is the S.W. extreme of the peninsula, on which stands Fort St. Antonio Light-house. From the cape a shoal bank projects S. nearly 5 m., called the shoal of St. Antonio, on which the tide makes ripples; the general depth on it is 4 fathoms; there are, however, shoaler spots, one near its S. extreme, with only 12 to 18 ft. The island Itaparica is lined with a shoal bank that bounds the W. side of the channel, and must be avoided; the depths are 10 and 12 fathoms in the fair track, a little outside the entrance of the harbour, deepening to 15 and 20 fathoms farther in. With a fair wind, when Cape St. Salvador is approached within 4 or 5 m., it should be brought to bear N. by E., and then steer to the N., direct for the harbour, borrowing on the Cape Bank if the wind be E.

Light. Bahia or St. Salvador Light, on Fort St. Antonio, in lat. $13^{\circ} 1' S.$, and lon. $38^{\circ} 32' W.$; *revolves* every eighty seconds, and is 140 ft. above H. W.; shows twice bright and once red, and is visible about 6 leagues. The red face is thus seen every 4 minutes. Fort do Mar has a *fixed* red harbour light.

Pilots say that a ship may borrow on the Cape Bank to 5 fathoms with a steady breeze, but not under 15 fathoms, with little wind. If the wind be at E.N.E. or N.E. a ship may work in with safety, taking care to avoid the W. shore; and a pilot will come off, if the signal be made. Anchor on arrival abreast the city, in 8, 10, or 12 fathoms, about 1 or $1\frac{1}{4}$ m. to S.W. of Fort do Mar: the bottom is sandy in some places. Officials will here visit the ship.

Tides. H. W. at 3 h. 45 m. on F. and C. of moon, rise of tide 8 ft. Variation $7^{\circ} W.$

Bahia is sometimes visited by outward-bound East India ships in want of refreshments, but its situation being nearly in the middle of the S.E. trade, navigators are cautious of touching here, thinking they may afterwards find it difficult to get to the S., on account of adverse S. winds, supposed to blow along the coast from March to Sept.; but the East India ships have usually proceeded from this port to the S. without difficulty, even in June, July, and August; for the wind generally draws well to the E. here, and more so as you proceed to the S. Between Sept. and March, winds generally prevail from N. by E. to N.N.E.; between March and Sept. from E. by N. to E.S.E. About the equinoxes, especially when the sun is advancing to the N., calms and variable light winds are experienced near the coast, particularly between Abrolhos and Cape Frio.

Morro de San Paolo Light, in lat. $13^{\circ} 22' S.$, lon. $38^{\circ} 52' W.$ is *revolving* every minute, 276 ft. above H. W. and visible 20 m.

ABROLHOS, or BRAZIL BANK, extends from lat. 17° to $20^{\circ} S.$, having depths from 20 to 60 fathoms, and on the parallel of 18° it projects about 40 leagues E. from the coast; Hotspur Bank, with 25 fathoms, is 20 leagues off it, in lon. $36^{\circ} W.$ It seems to be formed of several detached parts, with deep water between them, as soundings have been got by several ships as far to the E. as 36° , while others between that and the main bank have sounded in from 100 to 280 fathoms with no bottom.

Abrolhos Islands Light, in lat. $17^{\circ} 58' S.$, lon. $38^{\circ} 42' W.$, is on the highest part of Santa Barbara Island, *flashing* every minute, 190 ft. above the sea, visible 17 m., distant 13 leagues from the coast.

From Abrolhos Point to Espirito Santo, the coast lies about S. by W., and then more to the S.W. to Cape St. Thomé, in lat. $22^{\circ} 2' S.$ This part of the coast should not be approached too closely on account of several small islands, and shoals off the Cape itself.

Cape Frio Light, in lat. $23^{\circ} 1' S$, lon. $41^{\circ} 57' W$. (about 27 leagues to S.W. of Cape St. Thomé,) is *flashing*, every $1\frac{1}{4}$ minutes, duration of total eclipse 45 seconds, 520 feet above H. W.; visible 8 leagues, and from its great altitude is frequently obscured by haze.

Outside the Cape, S.W. and N.E. winds produce lee currents, which run from $\frac{1}{2}$ to $1\frac{1}{4}$ knots, and usually precede the wind. With S.W. winds there is a S.W. eddy in shore. Ships bound for Rio Janeiro always steer to make Cape Frio. The land about the Cape is of middling height, appearing at a distance like islands; to the N., the land is higher. From Abrolhos Bank to this place, soundings are got at a moderate distance from the coast.

RIO JANEIRO HARBOUR is about 20 leagues W. from Cape Frio, and ships approaching the latter must be careful not to run into the bay to the N. of the Cape with the wind E. or S.E. in the night: this has happened to several ships through ignorance of the currents.

In steering to the W., keep 3 or 4 leagues off shore, and when 9 or 10 leagues W. of Cape Frio, you will see the Sugar-Loaf, if clear weather; and soon after Round Island, bearing about W.: it bears from Cape Frio W. $\frac{1}{4}$ S. distant 64 m., and is in shape a perfect haycock. The Maricas are two or three small low islands near the shore, distant $3\frac{1}{4}$ leagues from Rio Harbour.

Raza Island Light-house is on its most elevated part, 315 ft. above H. W., exhibiting a light which *revolves* every $2\frac{1}{4}$ minutes, showing a bright and red light alternately, visible about 4 leagues; lat. $23^{\circ} 6' S$, lon. $43^{\circ} 8' W$. Variation of compass $3^{\circ} W$.

The Great Channel leading to the Harbour is between the Paya Islands to the E. and Raza Island to the W.; the entrance is formed by the Sugar-Loaf to the W. and Santa Cruz Point to the E., on which is a fort and a small *fixed* light, visible 6 m.; also a red fixed light on Calhabouco Point. Having the Sugar-Loaf open to the W. of Paya, steer direct for it; and if the wind be not likely to carry you fairly into harbour, anchor in 10 or 12 fathoms, about $\frac{1}{4}$ m. to S.E. of a small isle, lying just without the Sugar-Loaf, called Catunduba, or Tucinha. If you go farther in, the swell on the Bar will make you roll your ports in the water; and it is imprudent to anchor between the Sugar-Loaf and Santa Cruz, in the narrow part of the entrance, where the depth is greater, the bottom rocky, the channel not a mile wide, and with the tide rushing through it, between the rocky shores on each side, at the rate of 6 or 7 m. an hour on the springs.

The sea-breeze usually sets in before mid-day in the entrance of harbour, and continues till about sunset. Do not enter between the Sugar-Loaf and Santa Cruz Point with an ebb-tide, and the sea-breeze far expended; for several ships, at different times, have been nearly lost, by anchoring in the gut between them. If the breeze is light and fluttering, as soon as you pass Santa Cruz Point, haul up to the E.; for should you be obliged to anchor short, the ground is good on this side. The inner harbour lies within the islands Cobras and Enchadas. On the N.W. side of the former there is a convenient place to heave down ships of any size.

Pilots may be obtained outside by signal. With a chart the entrance may be easily made. Vessels anchor below Villegagnon Fort, till the health officer comes.

Rio Janeiro Harbour is easy of access, readily known by remarkable land about it, and very commodious. You should moor as soon as possible, the tides being much influenced by the winds, and the latter so variable, that it is difficult to keep a clear anchor 24 h.; it is high water at 3 h. F. and C. of moon, rise 4 ft. at springs, neap 1 to 2, the ebb then running much longer than the flood, and the velocity $3\frac{1}{4}$ or 4 m. per hour.

Large ships will find it convenient to be towed out clear of the bay and islands. A steam-tug may be hired for £25.

When bound out, if the wind is steady, steer direct for Santa Cruz Point, but edge over to the E. as soon as you can, if it is light, till Santa Cruz bears about S.S.E. $\frac{1}{4}$ E. The advantage of keeping to the E. is, that if you weigh in the morning with the land-breeze, at first generally very light, you are in the fair way of the tide, which will set you right out; but if more to the W., it may set you upon Square Island, some rocks with a fort on them. The bar is about $\frac{1}{4}$ or $\frac{1}{2}$ m. without Santa Cruz Point; the least water on it is 6 fathoms at low-water spring tides. It is about $\frac{1}{4}$ m. in breadth, the depth increasing gradually on each side.

In Sept., 1861, a graving dock was opened on Cobras Island, length on floor 284 ft., breadth at entrance 70 ft., depth 33 ft. Over the sill H. W. springs 28 ft. Neaps 26 ft. In 4 hours the dock is dry, being pumped out by an engine of 40 H. P. Another dock in 1866 was opened alongside the former.

Rio Janeiro, called also San Sebastian, affording abundance of refreshments, is frequented by ships of war, and others bound to India with troops on board, for obtaining supplies; but, unless in want of water, or otherwise obliged to run for a port, ships destined to India should not touch on the coast of Brazil, as it must lengthen the passage. Should a squadron of ships be obliged to stop somewhere, it may be preferable to go into Rio Janeiro, rather than into False Bay, at the Cape of

Good Hope, during the winter season, where supplies are not so abundant, nor anchorage so safe for a fleet or large squadron.

Santos Bay Light, in lat. $24^{\circ} 2' S.$, lon. $46^{\circ} 13' W.$, about 57 leagues to W.S.W. of Rio Janeiro, is a *fixed* light, 330 ft. above H. W., visible 8 leagues.

VARIATION of COMPASS. The meridian of no variation (in 1872) passes through Santos Bay in a N.N.W. and S.S.E. direction. At Trinidad and Martin Vas Rocks, it is $12^{\circ} W.$; whilst at St. Helena it is $25^{\circ} W.$

Along the coast of South America, to the S.W. of Santos, the variation is E., increasing gradually; till at Cape Horn it amounts to $21^{\circ} E.$

Santa Catherine Island has, at its S. point, Ponta Dos Naufragados, in lat. $27^{\circ} 49' S.$, lon. $48^{\circ} 32' W.$, a light *revolving* every minute, 149 ft. above H. W., visible 6 leagues.

Rio Grande do Sul exhibits a light *revolving* every 2 minutes, on its N. entrance, more than a mile within the point, 96 ft. above H. W., in lat. $32^{\circ} 7' S.$, lon. $52^{\circ} 4' W.$, and visible $4\frac{1}{2}$ leagues; there is only 11 ft. water on the bar, rise and fall about 2 ft. A shoal spit extends about $\frac{1}{4}$ m. seaward from each side of the entrance to the river.

WINDS and CURRENTS. It has been observed, that on the Brazil coast the winds are periodical, blowing from S.S.E. and S.E. from March to Sept., the current then running to the N.; and from Sept. to March, the wind blowing from N.E. and E.N.E., with a S. current prevailing; vessels are therefore directed to make the land to windward of the port they intend to touch at, according to the direction of the periodical winds blowing along the coast, which generally govern the currents. When the sun is in the N. hemisphere, the winds on the Brazil coast incline more to the S.E. than when it is S. of the equator, for at this latter time they prevail from the E.

It appears that in any season of the year, if the coast be not made to the N. of Cape St. Augustine, there is no difficulty in getting to the S.; for ships which have made the coast in lat. 7° and $8^{\circ} S.$, even in the unfavourable season, found little difficulty in getting to the S. after making a few tacks, and experienced little or no current to the N. But from March to Oct., in an indifferently-sailing ship, it would be imprudent to make the land to the N. of Cape St. Augustine, if it can be avoided. To the N. of Cape Ledo, or near Cape St. Roque, it certainly should not be made, on account of S.E. winds; and W.N.W. currents are liable to sweep a ship round Cape St. Roque to the W., which has frequently occurred.

Outward-bound ships touching at St. Salvador in any month of the year may, after leaving it, proceed to the S. without difficulty: for the winds mostly draw to E.S.E. in lat 13° or $14^{\circ} S.$, even in the most unfavourable season, and they are frequently variable near the coast, with land-breezes at times. About Cape Frio the prevailing winds are N.E. all the year, though often variable. Sea and land-breezes are usually experienced in the entrance to Rio Janeiro.

FROM BRAZIL COAST TOWARDS CAPE OF GOOD HOPE.

(VARIATION AT RIO JANEIRO, $3^{\circ} W.$; AT TRISTAN D'ACUNHA, $18^{\circ} W.$; AT GOOD HOPE, $30^{\circ} W.$)

During most months of the year the S.E. trade fails about the S. tropic, or 2° or 3° beyond it, where the wind is found to veer from the E. to N.E. and N.: the N. winds prevail more than any other in the vicinity of the S.E. trade, from the coast of Brazil to the meridian of Greenwich, or a little farther E., and as far as lat. 34° or $35^{\circ} S.$ When, therefore, a ship departs from the Brazil coast, or has got to the S. of the S.E. trade, she will most probably, in almost every month of the year, meet with brisk winds veering from N.E. to N.W., and sometimes to W. and W.S.W., which will carry her quickly to the E. These variable winds keep mostly between N.E. and N., attended with smooth water and fine weather. When cloudy weather accompanies these N. or N.W. winds, there is a risk of a sudden shift to the S.W. or S. This happened to H.M.S. *Bristol*, to the *Queen*, and to the *Anna*, in Jan. We were in lat. $31^{\circ} S.$, lon. $22^{\circ} W.$, and ran 230 m. the preceding 24 hours, and, with studding-sails set, were running at the rate of 10 or 11 m. per hour; when at 9 p.m. in a shower, the wind shifted from N.W. to S.S.W. in an instant, taking us aback; we lost all the light sails and booms, and the ship's head was thrown round against the N.W. sea, before the sails were trimmed, which made her plunge bowsprit and forecastle under. By running to the E. in the track of these N. and N.W. winds, gradually increasing the latitude as a ship proceeds, she will often make greater progress than by going to lat. 38° or $39^{\circ} S.$ in search of W. winds. Although here the W. winds prevail during most months of the year, they are often very unsettled, completing a revolution of the horizon with the course of the sun, every two, three, or four days, with intervening calms, particularly when the wind is from the S.W. quarter.

Unless, therefore, she be making the great-circle track to Australia, it seems inexpedient to

increase the latitude more than 35° S. till a ship has reached the meridian of Greenwich; she may then gradually proceed into 36° or 37° S. as she approaches the Cape, for the S. winds which prevail around the Cape land from Jan. to April, and at times in other months, extend far to the W. In Feb. and March these S. winds are most frequently experienced between the Cape and the meridian of Greenwich, on which account it is prudent for a ship bound to the Cape in this season to increase her latitude to 36° or $35\frac{1}{2}^{\circ}$ S. when she draws into E. longitude. She ought then to keep in about $35\frac{1}{2}^{\circ}$ S. if possible, till the Cape is nearly approached, to prevent being driven to the N. of Table Bay by S. winds and N. currents.

From Dec. to April, if it is not intended to touch at the Cape, a ship should get into lat. 37° or 38° S. about the meridian of Greenwich, and keep between 37° and 39° S. in running down her easting; for the winds will be found as favourable for this purpose in 38° or 39° S., or probably more so, than if she were in a higher latitude. In passing the bank of Cape Agulhas the stream of current setting W. ought to be avoided, by keeping in lat. at least 37° S., and she should not go to the N. of this parallel in running down her easting after passing the Cape, or she may be retarded by S.E. winds which prevail in these months to the N. of lat. 35° or 36° S.

ISLANDS NEAR THE ROUTE.

THE TRISTAN D'ACUNHA GROUP consists of three islands, the largest and N. being named after the Portuguese discoverer, Tristan d'Acunha. The N.W. point, "Herald Point," lies in lat. $37^{\circ} 3' \text{ S.}$, lon. $12^{\circ} 18' \text{ W.}$ The variation is 18° W.

The island is of circular form, 7 m. across, with a peak elevated 8,000 ft. above the sea, generally clad with snow, and may be seen about 30 leagues in lat. $37^{\circ} 6' \text{ S.}$, lon. $12^{\circ} 16' \text{ W.}$ A few people (about 80) reside in Falmouth Bay on the N.W. side. The climate is favourable to animal and vegetable productions; and not any of the infantine or other diseases known to populous countries are found here; the children are handsome and well-grown.

At the N. side, the island rises perpendicularly 1,000 ft. or more from the sea; then with a gentle acclivity to the base of the Peaked Mountain, which rises majestically over the table-land. This island, like St. Helena, is formed of abrupt hilly ridges, with chasms or deep valleys between them, and seems to be of volcanic origin. Trees which grow on the sides of ridges, are small, but burn well. Wild celery, parsley, and sorrel grow plentifully; and wild goats and hogs are found in the interior. Vegetables are abundant from Dec. to March. Water is easily obtained at all times, by placing a hose under the fall, to lead into the boat, which lies off at anchor. Bread, bacon, eggs, butter, milk, poultry, beef, and mutton were abundant; but for groceries and clothes the inhabitants depend on a passing emigrant vessel. The water cannot be rafted off, on account of seaweed surrounding the island. Boats should be sent on shore in the mornings, and hoisted in at night; the ship keeping under sail.

The best anchorage is in 25 fathoms, gray sand, about a mile off shore, to N. of the Cascade or watering-place. Sailing vessels should not anchor, but keep off and on, not approaching within 2 m., to avoid baffling eddy winds from under high land on the N.W. side: the depth is 46 fathoms. A sunken rock is said by the islanders to exist nearly 2 m. to the E. of the S. point, having a few feet of water over it.

There is a rock off the W. cliffs called 'Sail Rock,' and when on a S.W. bearing, it is closing with the N.W. part of the island, and the white cottage S.W. by S. This is the best line to run in on, either for sending a boat on shore whilst standing off and on, or for anchoring, which a steam-vessel might do without incurring any risk. The sea rises suddenly prior to a strong N. or N.W. wind, which is liable to drive a ship on the rocks, if she cut or slip from her anchors, in order to gain an offing. The *Julia* brig of war, was wrecked here, and several of her crew perished. Should a vessel anchor, she ought to put sea immediately on the appearance of an unfavourable change, or if the wind is inclined to veer to the northward of W.; but as the swell sets in before the wind, it is impossible for a sailing vessel to get under way without being driven on the rocks. Rise and fall of water is from 4 to 6 ft. The shores of this and the adjacent islands are fronted by kelp, which floats on the water to the depth of 15 fathoms.

Rollers are heaviest about Dec., lasting three or four days: but during winter months, May to Sept. they are more frequent.

Winds.—Aug., Sept., and half Oct., are the worst months, when a heavy gale generally commences at N.E., backs round to N.W., then to S.W., from which quarter it blows hardest, and for several days, with a heavy confused sea. From Dec. to March is the finest season. E. winds seldom continue longer than 24 hours at a time near these islands; but S.W. and N.W. winds prevail; with storms from N.W. in winter, and dark thick weather, requiring great caution in run-

ning here at such times. As soon as the wind veers to the northward of W., thick fogs immediately darken the atmosphere. The ship, *Blendon Hall*, from London, bound for Bombay, was totally wrecked on Inaccessible Island, July, 1821; the crew and passengers suffered great privations, living on penguins and their eggs till Nov., when some of them reached Tristan d'Acunha in a small boat made out of the wreck, where they procured two whale-boats, and returned to Inaccessible Island for the remaining crew. On the 9th of Jan., an English brig, from Brazil, touching at Tristan d'Acunha for water, took them all to the Cape of Good Hope, where they arrived on the 18th.

INACCESSIBLE ISLAND, bearing from Tristan d'Acunha S.W. $\frac{1}{2}$ W. (*true*), distant 23 m., is the middle and westernmost of the group, in lat. $37^{\circ} 17' S.$, lon. $12^{\circ} 36' W.$ It is high and woody, about 9 m. in circuit, and may be seen about 14 leagues in fine weather; without harbour or cove; but there are several small spots of pebbly beach, with the mountain rising perpendicularly over them. There is a high reef of rocks off the S. point: soundings are got within a mile of the N.E. point, and 20 fathoms black sand with small reddish stones, when the body of the island bears W. Several streams of water issue from the top of the mountain.

Nightingale Island, the smallest and S. island, bearing from Tristan d'Acunha S. $20^{\circ} W.$ (*true*), distant 26 m., is in lat. $37^{\circ} 27' S.$, lon. $12^{\circ} 29' W.$; about 6 or 7 m. in circuit, having two rocky islets off the N.E. point, and some at the S. point. On the E. side there are soundings in 33 fathoms, sand, the middle of the island bearing W.S.W.

GOUGH ISLAND, or DIEGO ALVAREZ (the centre) is in lat. $40^{\circ} 19' S.$, lon. $9^{\circ} 44' W.$ This island is about 5 or 6 m. in extent, or 15 or 16 m. round, elevated about 4,385 ft. above the sea; its surface is covered mostly with a light coat of mossy grass, and some of the small bushy trees may be observed, which abound on Tristan d'Acunha. Cliffs rise steeply from the sea, having several cascades of water issuing from them. A boat landed with safety at a cove on the N. of the island, close to the E. of one of the rocky islets that adjoin it on that side. The Church Rock, resembling a church with a high spire on its W. end, is near the N.E. point of the island; and to the S. of this rock, on the E. side of the island, lies an islet near the shore, within which the landing is safe and easy, being protected by the N.E. point from the swell and N. winds. Between the islet and the S.E. point of Gough Island, there seemed to be a small bay or cove, where a ship might anchor, about $\frac{1}{2}$ m. off shore. It is said that fresh water can be obtained in this cove.

Sunken Rocks.—Three sunken rocks (*uncertain*), in lat. $37^{\circ} 31' S.$, lon. $4^{\circ} 42' W.$; seaweed said to be on them.

THE ROLLERS OF THE SOUTH ATLANTIC.

Rollers at Ascension are described by Surgeon Webster, of H.M.S. *Chanticleer*, in 1829:—

One of the most interesting phenomena at Ascension are the rollers; a heavy swell producing a high surf on the leeward shore, and occurring without any apparent cause. All is tranquil in the distance, the sea breeze scarcely ripples the surface, when a high swelling wave is suddenly observed rolling towards the island. It moves slowly forward, till it breaks on the outer reefs. The swell then increases, wave urges on wave, until it reaches the beach, where it bursts with tremendous fury. Rollers now set in and augment in violence, until they attain a terrific and awful grandeur. A towering sea rolls forward on the island, like a vast ridge of waters threatening to envelop it; pile upon pile succeeds with resistless force, until, meeting with the rushing off-set from the shore beneath, they rise like a wall, and are dashed with impetuous fury on the long line of coast, producing a stunning noise. The beach is now mantled over with foam, the waters sweep over the plain, and the very houses at the town are shaken by the fury of waves. The continuous ridge of water is crested on its summit with foam and spray; for as the wind is off the land, the over-arching top of the roller meets resistance, and is carried, as it were, back against the curl of the swell; thus it plays elegantly above it, as it rolls furiously onward, graceful as a bending plume; while, to add to its beauty, the sunbeams are reflected in all varied tints of the rainbow. Amid the tranquillity that prevails around, it is not easy to account for this commotion of waters, as great as if the most awful tempest had swept the ocean surface. It occurs in situations where no such swell would be expected, in sheltered bays, and where the wind never reaches the shore. The strong and well-built jetty of the town has once been washed away by rollers, which sometimes make a complete breach over it, although it is 20 ft. above H. W. mark. On these occasions, the crane at its extremity is turned round in various directions, as a weathercock is turned by wind; and landing becomes impracticable for two or three days together.

Such are the rollers of Ascension, and those of St. Helena and Fernando Noronho are similar. The season at which they prevail is from Dec. to April, not but what they do occur at other periods, and they have been felt severely in July. Vessels in the bay are perfectly secure, and they have to

apprehend no danger unless within the immediate influence of the breakers. Not only are the seasons of rollers the same at St. Helena and Ascension, but they sometimes are simultaneous in occurrence. Rollers occur in the most tranquil season of the year, when the S.E. trade wind is often very light. They rise without any apparent cause, for as a rule the weather is fine and wind light, although the spray of the surf beating on the beach rises to the height of 50 or 60 ft. Many lives have been lost in consequence of boats being capsized; and at St. Helena, in February, 1846, thirteen vessels moored $\frac{1}{2}$ m off shore were driven from their moorings and totally wrecked; the wharves and batteries also suffered considerable damage.

CHAPTER V.

WEST COAST OF AFRICA AND ADJACENT ISLANDS.

CAPE VERDE—SIERRA LEONE—FERNANDO PO—CONGO RIVER—BENGUELA—WALFISH, ELIZABETH, AND SALDANHA BAYS—TABLE BAY—CAPE GOOD HOPE.

(VARIATION AT CAPE VERDE, 19° W.; AT CAPE PALMAS, ANNO BOM AND CONGO, 20° W.; AT BENGUELA, 28° W.; AT WALFISH BAY, 27° W.; AT TABLE BAY, 30° W.)

Headlands or Islands on the W. Coast of Africa and in Gulf of Guinea, are sometimes seen by East India ships proceeding by the E. route to St. Helena: the following geographical positions therefore are given:—

North Cape Blanco, lat. $33^{\circ} 8' N.$, lon. $8^{\circ} 38' W.$, a white cliff 170 ft. high.

Cape Ghir (Agadir), lat. $30^{\circ} 38' N.$, lon. $9^{\circ} 50' W.$, a bold bluff 1200 ft. high.

Cape Noun, lat. $28^{\circ} 46' N.$, lon. $11^{\circ} 3' W.$

Cape Juby (19 leagues to S.E. of the Canary Islands) is in lat. $27^{\circ} 58' N.$, lon. $12^{\circ} 53' W.$

False Cape Bojador, lat. $26^{\circ} 25' N.$, lon. $14^{\circ} 10' W.$

Cape Bojador, lat. $26^{\circ} 7' N.$, lon. $14^{\circ} 29' W.$

River Ouro, South point of Peninsula, forming mouth, lat. $23^{\circ} 37' N.$, lon. $16^{\circ} 1' W.$

Cintra Reef, lat. $23^{\circ} 6' N.$, lon. $16^{\circ} 13' W.$, at 2 m. to S.W. of point.

Cape Barbas, lat. $22^{\circ} 20' N.$, lon. $16^{\circ} 45' W.$

Pedra de Galha Point Reef, lat. $22^{\circ} 13' N.$, lon. $16^{\circ} 56' W.$, at 2 m. off point.

Cape Corveiro, lat. $21^{\circ} 47' N.$, lon. $17^{\circ} 0' W.$

South Cape Blanco, a white cliff about 100 ft. high, lat. $20^{\circ} 46' N.$, lon. $17^{\circ} 5' W.$

Numerous shoals lie off shore for 100 m. to S. of South Cape Blanco. Soundings off the Cape itself are a guide; ships should not shoal under 20 fathoms. But, at 50 m. S.S.W. from the Cape, the shoals are very steep-to, and should be avoided. The prevailing current sets to the S.

Senegal Light, in lat. $16^{\circ} 1' N.$, lon. $16^{\circ} 31' W.$, is a small *fixed* light, visible 6 m. It is shown at the French Government house on Ile de St. Louis. A better light is proposed.

CAPE VERDE LIGHT, in lat. $14^{\circ} 44' N.$, lon. $17^{\circ} 31' W.$, is *revolving* every 30 seconds; elevated 370 ft.; visible 27 m. There are two small Red lights to the E. of it.

Cape Verde, the W. point of Africa, stands 100 leagues E.S.E. from Bonavista, the E. island of the Cape de Verde group. The French settlement, **Goree**, to the S. and E. of the Cape, affords shelter from all winds except S.E., which occur in the rainy season from July to Oct. (For Cape de Verde Islands, *see* page 39.) **Gambia River Light-house**, on Cape St. Mary, lat. $13^{\circ} 30' N.$, lon. $16^{\circ} 41' W.$, has a *fixed* light, 70 ft. above sea, visible 10 m. Shoal water extends 15 m. to S.W., and more than 10 m. to W. of this light. **Cape Roxo**, lat. $12^{\circ} 20' N.$, lon. $16^{\circ} 46' W.$, has shoals also off it and **Cape Skyring**, where the talented R.N. surveyor of that name was murdered.

The **Bijougas**, or **Bissagos**, are a group of islands surrounded by shoals, lying off the rivers Jeba and Grande, between lats. $11^{\circ} 0' N.$ and $11^{\circ} 40' N.$ Their outermost shoal, called **W. Breaker**, is in lat. $11^{\circ} 31' N.$, lon. $16^{\circ} 58' W.$

Tides. Near the Bijougas, H. W. at F. and C. of moon at $7\frac{1}{4}$ h.; springs rise 8 ft.

SIERRA LEONE CAPE has a *fixed* Red light, 70 ft. above sea, visible 12 m.; in lat. $8^{\circ} 30' N.$, lon. $13^{\circ} 18' W.$ The rainy season here is from May to Sept., when S.W. winds prevail. Tornadoes, blowing between E. and S.E., precede and follow this season. The Harmattan, or desert wind from N.E. to E., prevails in Nov. and Dec.

St. Ann Shoals front the coast to the S. of Sierra Leone, extending between 30 and 40 m. from Cape St. Ann, to lon. $13^{\circ} 34' W.$ The current, although W. outside, sets sometimes (the Guinea current) very strong to the E. near these shoals, rendering caution necessary in approaching during night, or in thick weather. **Cape St. Ann** the W. extreme of Sherboro Island, is in lat. $7^{\circ} 34' N.$, lon. $12^{\circ} 57' W.$, having off it a group called the Turtle Islands. The bank on which these islands are placed is connected with the shoals just described. From Cape Verde to Sherboro Island, soundings extend to a considerable distance from the land.

Cape Mesurada has a *fixed* light 240 ft. above H. W., visible 5 leagues, in lat. $6^{\circ} 19' N.$, lon. $10^{\circ} 50' W.$ This light is reported as indifferent, and not seen so far off.

Cape Palmas, lat. $4^{\circ} 22' N.$, lon. $7^{\circ} 44' W.$, is a rocky peninsula, about 75 ft. above sea, covered with houses on its E. side. The Cape should not be rounded under 28 fathoms. There is a *fixed* light on the Cape, 100 ft. above H. W. Variation of compass $20^{\circ} W.$ H. W. at F. and C. at 4 h. 30 m. Rise of tide, 4 to 6 ft.

Cape Three Points, 110 leagues to E. of Cape Palmas, is in lat. $4^{\circ} 45' N.$, lon. $2^{\circ} 6' W.$

Cape Coast Castle has a *fixed* light on Fort William, 192 ft. above H. W.; lat. $5^{\circ} 6' N.$, lon. $1^{\circ} 14' W.$ **Elmina**, hitherto the Dutch head-quarters on the Gold Coast, is 3 leagues to the W. of Cape Coast Castle. The new colony of Elmina and Dutch Guinea has now (1872) been formally transferred to the British Crown.

Cape St. Paul, the W. extremity of the Bight of Benin, is in lat. $5^{\circ} 48' N.$, lon. $0^{\circ} 56' E.$

Cape Formosa, in lat. $4^{\circ} 15' N.$, lon. $6^{\circ} 10' E.$, separating the Bights of Benin and Biafra, is very low, and no distinct cape, being merely the most prominent part of the delta of the Quorra or Niger. The coast from Cape Formosa extends 50 leagues to the E. to the head of Biafra Bight. To the N. and to N.W. of Fernando Po, are situated the rivers of Old and New Calabar. Vessels bound for them must anchor outside and wait for a pilot.

FERNANDO PO ISLAND, belonging to Spain, is in the middle of Biafra Bight, 19 m. from the mainland, and about 13 leagues W. of the great river Camarouns; the Peaked Mountain at its N.E. extremity is about 10,000 ft. high, and visible in clear weather 30 leagues; but a haze generally prevents it being seen so much as 3 leagues. This island is about 40 m. in length and 20 m. in breadth, or 30 leagues in circuit, inhabited by negroes, known to Europeans as Boobées; it is well watered, abounding with excellent yams, sugar-cane, and fruits. Cape Bullen, the N. point of the island, on the W. side of Maidstone Bay anchorage, is in lat. $3^{\circ} 48' N.$, lon. $8^{\circ} 43' E.$, and Point William, 5 m. further E., has now a small *fixed* light. Cape Barrow, the S. point, is in lat. $3^{\circ} 13' N.$, lon. $8^{\circ} 43' E.$ (see Winds, page 64.)

Prince's Island (Portuguese Fort St. Antonio), in lat. $1^{\circ} 39' N.$, lon. $7^{\circ} 26' E.$, is about 40 leagues N.W. of the River Gaboon, and 37 leagues to the S.W. of Fernando Po. It is high, with the town and tolerably secure harbour of St. Antonio on the N.E. side, where bullocks, hogs, goats and water may be procured. There are several rocks and islets in the neighbourhood. July and August are here dry months, with S.W. breezes; the rainy season is from Sept. to March.

Tides. H. W. at F. and C. of moon at 4 h.; springs rise 6 ft., neaps 4 ft.

ST. THOMAS' ISLAND, 43 leagues N.W. of Cape Lopez, and 7000 ft. high, has its N. extremity in lat. $0^{\circ} 24' N.$, lon. $6^{\circ} 38' E.$, and the islet off its S. end is on the equator. This island belongs to the Portuguese, and affords some articles of refreshment for ships touching at Man-of-War Road and Santa Anna de Chaves Bay on the N.E. side. The shore to the N. of the latter being rocky and steep, should have a wide berth in passing. The small islet of Cabras lies between these anchorages, at the distance of $1\frac{1}{2}$ m. from shore, having a channel of $2\frac{1}{2}$ fathoms inside it. The anchorage in Man-of-War Bay is to the N.W. of Cabras Islet, in 10 or 12 fathoms good holding-ground, and in the tornado season is preferable to that of Anna de Chaves, on account of the facility of getting to sea with the wind at N.E., from which quarter tornadoes blow. To approach Anna de Chaves Bay, it is better to proceed round by the S. end of the island, because the current sets mostly to the N., and the winds prevail from S.

Light. Fort San Sebastian, on the S. side of Anna de Chaves Bay, has a small *fixed* light, visible 4 or 5 m.; lat. $0^{\circ} 20' N.$, lon. $6^{\circ} 43' E.$ Large vessels must anchor outside the Bay.

ANNO-BOM ISLAND, the N.W. point of which is in lat. $1^{\circ} 24' S.$, lon. $5^{\circ} 36' E.$, is about 60 leagues W. from Cape Lopez, and 33 leagues to S.W. of St. Thomas. Anno-Bom is now claimed by Spain, but she has no representative there. This island, which has two hills, the summits of which are 3000 ft. high, and often clouded, is refreshed by constant breezes, which render it healthy; it abounds with tropical fruits, domestic animals and poultry: the inhabitants are Roman Catholic negroes, but very ignorant; although not strictly honest in their dealings with strangers, they are well disposed; exchanging pigs, goats, fowls and fruits (being all the island affords,) for linen cloth, cutlery, needles, &c. The best anchorage is at the N.E. part of the island, off the village of San Antonio, rather over $\frac{1}{2}$ m. off, in 10 to 15 fathoms, with De Fogo, the N. peak S.S.W. $\frac{1}{2}$ W., and Turtle Island S.E. $\frac{1}{2}$ S. The watering-place is to S.E. of this anchorage. Oranges are abundant. Anno-Bom has two rainy seasons; April and May, Oct. and Nov. Variation of compass $20^{\circ} W.$

Currents to N. of Anno-Bom are variable. To the W. of it the equatorial current sets to W.N.W.; in April and June nearly 1 m. per hour. To the E. of the Island they set between N. and N.N.E. Anno-Bom is always in the *equatorial*, whilst Prince's Island is always in the *Guinea* current.

AFRICAN COAST. Nearest point to Anno-Bom, 60 leagues off, is the low and woody Cape Lopez, in lat. $0^{\circ} 36' S.$, lon. $8^{\circ} 43' E.$ The whole of this coast, which is generally low to Angola, may be approached to 15 or 20 fathoms. In lat. $2^{\circ} 10' S.$ the bank of soundings deepens regularly from 16 fathoms about 3 leagues off shore, to 70 fathoms about 9 leagues off; then no bottom at 100 fathoms.

Loango Bay (river entrance), in lat. $4^{\circ} 39' S.$, lon. $11^{\circ} 42' E.$, is surrounded by red cliffs; and from the S. extremity, called Indian Point, in lat. $4^{\circ} 40' S.$, a reef projects nearly half-way across the bay, with 3 fathoms water on it; the extremity is about 4 m. off shore, with Indian Point bearing S.E. There is good anchorage within the reef in 4 fathoms, $\frac{1}{2}$ m. from shore; but surf prevents landing, except in canoes of the country.

Rollers are frequent and strong on this coast, especially at spring tides; they occur mostly during calms.

CONGO RIVER (Shark Point), in lat. $6^{\circ} 5' S.$, lon. $12^{\circ} 12' E.$, is wide, with rapid freshes running out of it to the N.W., particularly in the rainy season, which discolour the sea to a distance from land, and carry floating islands of trees and grass a great way out to sea. These freshes run sometimes 5 or 6 m. an hour, there being little or no tide; and as there is upwards of 100 fathoms water in the middle of the entrance, the difficulty of navigating it is great.

St. Paul de Loando, a city of considerable extent, in lat. $8^{\circ} 48' S.$, lon. $13^{\circ} 13' E.$; the Citadel of San Miguel is on the S. shore of Bengo Bay, on an island 10 leagues long, which, with a peninsula of the main, forms a good harbour, that will contain the largest fleet in perfect safety. This is the chief settlement of the Portuguese on the coast of Angola, and the best place for a ship to obtain refreshments. The principal articles of commerce are ivory, gum-copal, orchilla, and bees' wax. Coals and marine stores are procurable, with live stock, vegetables and fruit.

Light-Vessel. Loando Island and reef form the N.W. side of the harbour. To the E.N.E. and $\frac{1}{2}$ m. off the point of the reef, a light-vessel is moored, showing a small *fixed* white light. Ships pass to the N. of this.

Point Palmarinhas, lat. $9^{\circ} 8' S.$, lon. $13^{\circ} 0' E.$, is a low sandy cape, with clumps of palm trees, 8 leagues to S.W. of Loando Point. Along this Angola coast the *good* season is from May to Oct.; and the *bad* from Nov. to April; but March and April are the worst rainy months.

BENGUELA BAY. The Fort Flag-staff of St. Philip of Benguela, the chief Portuguese settlement on the coast, is in lat. $12^{\circ} 34' S.$, lon. $13^{\circ} 24' E.$ The extreme points extend from each other about 7 or 8 m; and the Bay is about $2\frac{1}{2}$ m. in depth to the beach; the depth of water decreases gradually from 17 to 6 fathoms within a mile of the shore. This place was chiefly supported by trading in slaves, who were mostly carried to the coast of Brazil; but Benguela is now in a state of decay. As liquor-shops are numerous, captains ought to be careful in letting their seamen visit the town. Variation of compass $28^{\circ} W.$

Tides. H. W. at F. and C. of moon occurs at 3 h. 45 m.; tides rise 5 ft.

Cape Negro, the Pillar, in lat. $15^{\circ} 41' S.$, lon. $11^{\circ} 58' E.$, the S. limit of Portuguese dominion, is of a level, brown, sandy appearance, discernible when clear at 7 leagues' distance; but the atmosphere is generally hazy along this coast of Africa.

Port Alexander, Bateman North Point, in lat. $15^{\circ} 44' S.$, lon. $11^{\circ} 57' E.$, has from 14 to 20 fathoms water in it, and seems to be well sheltered from all winds. The Sandstone cliff of this port, which is 134 ft. high, and visible far off, is 4 m. to S.W. of Cape Negro. Dormer Bank, with 3 to 7 fathoms on it, lies N.E. by E. $\frac{1}{2}$ m. from Bateman Point; betwixt it and the Point is a clear channel of 20 to 24 fathoms.

Great Fish Bay.—Tiger Point, in lat. $16^{\circ} 30' S.$, lon. $11^{\circ} 43' E.$, is a narrow, sandy peninsula on the W. side of this Bay, which has even soundings from 12 to 6 fathoms, being a spacious and safe harbour. No fresh water being procurable on the coast, from lat. 16° to $16^{\circ} 31' S.$, these bays are seldom visited except by whalers. The lowness of the land and almost constant thick haze make it difficult to recognise.

Cape Frio, in lat. $18^{\circ} 23' S.$, lon. $11^{\circ} 57' E.$, and more than 100 m. to S. of Gt. Fish Bay, is also low and sandy. The winds prevail from S.W., often strong and causing a heavy sea. The current sets constantly to N.

WALFISH BAY, Pelican Point, in lat. $22^{\circ} 52' S.$, lon. $14^{\circ} 27' E.$, is spacious and well sheltered, except from N. winds, which seldom blow here; and it is frequented by whalers. Soundings extend a considerable way off the coast, from hence to Cape Negro.

Hollam's Bird Island is about 9 m. off shore, in lat. $24^{\circ} 37' S.$, lon. $14^{\circ} 27' E.$ The Alligator Rocks, said to have breakers 18 m. off shore, to the S.W. of Hollam's, about 2 leagues, have of late years been searched for, in vain.

Spencer Bay, in lat. $25^{\circ} 46' S.$, has 5 and 6 fathoms water; but although sheltered by Mercury Island on the W. side of the entrance, it is rather exposed to N. winds.

ELIZABETH BAY is formed by Possession Island, which lies about 8 m. from the land, having a channel between them of 8, 9, and 10 fathoms; the S. point of this Island is in lat. $26^{\circ} 58' S.$, lon. $15^{\circ} 13' E.$ A ship may anchor under the Island, and be sheltered from W. to S.W.; but some sunken rocks lie 1 m. to S.E. of the N. point of the Island. This place is the boundary between the Kaffer and Hottentot countries.

Cape Voltas, in lat. $28^{\circ} 44' S.$, lon. $16^{\circ} 32' E.$, is to the S. of Orange or Giarep River; an extensive shoal projects from it, and to the S., adjoining the coast, there are several islets. Orange River, dry bar, is in lat. $28^{\circ} 38' S.$, lon. $16^{\circ} 28' E.$

To the S. of Cape Voltas, soundings extend about 6 leagues off. There are no harbours for large ships till St. Helena Bay is reached. **Cape Donkin** is in lat. $31^{\circ} 54' S.$, lon. $18^{\circ} 19' E.$

WINDS AND WEATHER—CURRENTS—ATLANTIC ROLLERS.

To the N. of Cape Verde, the usual winds are from N. and N.N.E. During the rainy season, July to Oct., storms come from S.E.; vessels, then in Senegal Road, will find it easy to get under way; returning to their berths with light S.W. winds which succeed the gale. Between Cape Verde and Sierra Leone, a regular change of wind and current takes place, according to the season; a N.E. or N. wind with a S.E. current from Oct. to May; S.W. winds with N. currents between June and Sept. In Goree Road, the winds are between N.E. and N.W. from Nov. to June; but squalls from S.E. come in the rainy season. At Sierra Leone the rainy season continues from May to Sept.; in the latter part, S.W. winds bring in the Atlantic rollers. Between Jan. and March, Harmattans (E. winds) prevail; nights and mornings are very cold, with a thick haze.

Along the coast of Sierra Leone and the Grain coast to Cape Palmas, N.W. and N.N.W. winds prevail. From thence, across the Gulf of Guinea to Cape Lopez, the winds are generally from S.W. and S.; sea-breezes, blowing towards the heated land. Thus, in S. latitude, they are observed near the land to take a more W. direction, often prevailing from S.W. and W.S.W. along the African coast between Cape Lopez and Benguela. As the distance is increased from the coast, the winds become more S.; the S.E. trade, from S. or about S.S.E., is often found in the Gulf of Guinea, by vessels more than 100 leagues from the coast of Africa. Between 7° and 15° S. latitude, some ships, however, have been perplexed with winds from S. and S. by W. until several degrees to the W. of a line drawn from Cape Good Hope to Cape Palmas; although this seldom happens.

Along the Coast of Guinea, from Cape Lopez to Sierra Leone, in Dec., Jan. and Feb., the **Harmattan**, a dry, parching E. wind sometimes blows. It may appear at any period of the moon, continuing sometimes only one or two days, at other times five or six, and has been known to last fifteen or sixteen days. There are generally three or four returns of it every season, and it usually blows moderately. On the coast of Sierra Leone its direction is from E.S.E., and the same towards Cape Verde; on the Gold Coast from N.E., and at Cape Lopez and the River Gaboon from N.N.E. The Harmattan is accompanied by a dark haze, and is a parching wind, destructive to vegetation, but purifies the atmosphere from infectious exhalations. Preceding and subsequent to the rainy season, on coast of Guinea, **Tornadoes** may be expected; these are hard squalls from E. and E.S.E., accompanied with thunder, lightning, and much rain. In the Gulf of Guinea, faint breezes and calms are also frequent at various seasons of the year. In the fair season, on the coasts which embrace the Gulf of Guinea, land and sea-breezes prevail; but the winds blow almost constantly from the sea during the rainy season from May to Sept.

The Rains set in on coast of Guinea, and at Fernando Po in May, and continue till Oct. To the S. of the equator, on the coasts of Loango, Congo and Angola, the rainy season is later. At the River Gaboon, it commences at the end of Sept., and continues till Jan. In the Congo, it begins early in Nov., continuing till mid-April. Near Benguela there is most rain during Feb. and March.

Haze, more or less intense, envelopes the African coast at all times; during the Harmattan, it is very dense; and, though partially dispersed by tornadoes and the rainy season, returns with increased density when they cease. The deceptive effect of this haze is to make the land appear much farther off than it is. Refraction, produced by the heated atmosphere, hinders accuracy in taking observations of the sun.

Currents. The current, contracted in breadth between the Canaries and African coast, runs to the S., from 1 m. to $1\frac{1}{2}$ m. per hour; onwards towards Senegal its velocity is less than $\frac{1}{2}$ m.; thence, augmented by the river ebb, it runs towards Cape Verde. Between that Cape and Sierra Leone, numerous tidal rivers are felt for some 20 leagues off shore. Outside of them, the Guinea current is felt.

Currents are variable on the Grain Coast; in the S.W. monsoon, when the sun is far to the N., they frequently run to the N.W., but from Dec. to May always to the S.E. They set mostly between N. and E. across the Gulf, from Cape Palmas to Cape Lopez; this is a branch current from the Trade-drift, generally extending 100 m. from the coast, but sometimes to lat. 2° N. From lat. 2° N. across the equator to lat. 1° or 2° S., the current frequently sets strong to the W.: this is mostly when the sun has great N. declination; at which time, with S.W. winds, the Guinea current attains its greatest rapidity.

About Cape Lopez, and from thence along the coast to the S., the current often sets to the N.; at other times it is variable, with strong rippings near the rivers in the rainy season; when, by freshes from these rivers, added to a body of water driven towards the coast by the S.W. wind, it is turned backward, and forms a W. current to the S. of Anno-Bom.

Passing along the Gulf of Guinea, between Cape Mount and Cape Three Points, General Sabine, during his scientific voyage in H.M.S. *Pheasant*, in April and May, 1822, experienced 180 m. of the Guinea current, which, in the season when S.W. winds prevail, runs with considerable velocity from Cape Palmas to the E. part of Gulf of Guinea. The breadth of this current fronting Cape Palmas varies with the season, and has been found to extend to 180 m.; in its subsequent course to the E., it enlarges to nearly 300 m., and occupies the whole space between the land and the Equatorial current which runs in an opposite direction. The velocity off Cape Palmas and Cape Three Points, and in the vicinity of the land, in the month of May, was about 2 m. per hour; farther to the E., where the *Pheasant* crossed it, from Cape Formosa to St. Thomas, the rate was rather less than 1 m. per hour, and the direction a little to the S. of E. In the passage between River Gaboon and Island of Ascension, 1,400 m., the *Pheasant* was carried 300 m. in the direction of her course by the current. The Equatorial current commences much nearer the African Coast than is usually imagined, and the Island of Anno-Bom appears to be always in it; while Prince's Island experiences the Guinea current. St. Thomas being intermediate, is in turns subject to both currents.

But the distinction between the waters of the Equatorial and Guinea currents is the more remarkable; these streams, in contact with each other, flowing with great velocity in opposite directions, have a difference of temperature of 10° or 12° . Their course continues parallel to each other and to the land, above 1,000 m.; and, according as a vessel, intending to proceed along the coast in either direction, happens to be in the one or other of these currents, her progress will be accelerated or retarded from 40 to 50 m. per day.

Rollers. Off Senegal, a long swell generally rolls in. At the Bijouga Islands and Sierra Leone, the Atlantic rollers may be expected at the latter part of the rainy season; they curl in 5 fathoms and break heavily in 3 fathoms. Along the coast of Guinea, at Lagos and mouth of the Niger, even at the driest and best season, a long heavy swell rolls in. As the sun approaches the N. solstice, and S.W. winds come on, the rollers increase in violence; in July, Aug. and Sept., there is almost continuous rain with strong sea-breezes and heavy swell from S.W. Between May and Sept. is the time of worst rollers at the Gaboon and Congo Rivers; but, near Benguela, they occur throughout the year.

COAST OF SOUTH AFRICA.

St. Helena Bay, about 30 leagues to N. of Table Bay, and formed on the E. side of Point St. Martin, in lat. $32^{\circ} 40'$ S., lon. $17^{\circ} 54'$ E., is about 4 leagues deep, with regular soundings from 12 or 10 fathoms to 6 and 5 fathoms near the shores, the bottom mostly sand and shells. Berg River, a small stream, falls into the bottom of the Bay, having some springs near it, and a few houses on each side. Martin Rock lies in this Bay, 10 m. to E. of St. Martin Point. In summer the anchorage is safe, as S winds then prevail; but St. Helena Bay is open to N.W. winds. During winter, when N.W. gales are frequent, it is unsafe: these gales extend sometimes to the N. of this Bay.

Dangers lie off this rock-bound projecting coast between Cape St. Martin and Saldanha Bay. Britannia Rock, in lat. $32^{\circ} 40'$ S., lon. $17^{\circ} 43'$ E., is 14 m. to N.W. by W. of that Cape. Others exist nearer to shore. Duminy Rock is 9 m. to S.S.W. of Britannia, and 6 m. off shore.

SALDANHA BAY is about 18 leagues to the N. of Table Bay. The Ship Rock, on the N. side, in lat. $33^{\circ} 2'$ S., lon. $17^{\circ} 54'$ E., is at the N. side of entrance. The entrance, about 2 m. wide, is between Malgassen Island (which lies about E.S.E. $1\frac{1}{4}$ m. from Ship Point), and Jutten Island, to S. of Malgassen, and about N.E. by N. $1\frac{1}{4}$ m. from Stomp Point. These low islands are not discerned when running for the Bay, unless a look-out be kept at the mast-head.

Marcus Island is nearly in mid-channel to the E. of Malgassen and Jutten. Eyland Point

lies 3 m. to N.E. of Stomp Point, and from it the coast runs about S.E. and S.S.E. to Salamander Bay. The chart of the Bay must be looked at to understand the positions of dangers and channels, which are to the S.E. of Salamander N. Point.

Malgassen is nearly surrounded by sunken rocks; between it and the main, although there is sufficient water, the bottom is foul, and the N. shore from Ship Rock to Baviaan Bay is rocky, which, with a heavy swell, renders it an unsafe passage for a vessel. Between Jutten and the main there is a safe passage with 7 to 11 fathoms, sand and shells. The bottom is foul 100 yards off this island, and the same off the main; but the principal channel, between Jutten and Malgassen, has 22 to 13 fathoms, sand. Marcus Island may be passed on all sides within a cable's length. The widest passage, to the S. of it, is the best with a S. wind; for in summer, if you wish to anchor in the S. part of the bay, in order to sail out with a S.E. wind, you will be able to fetch the anchorage. From Eyland Point to Salamander N. Point, the shore may be freely approached with the lead going. In the S. part of Bay the best anchorage is to the E.S.E. of Eyland Point, in 6 to 7 fathoms. In the lagoon to the S. of Schapen Island there is a snug anchorage. The chart and lead must be guides in this part of the Bay.

Hoetjes Bay, which is the N. portion of Saldanha Bay, where a ship may be hove down, has regular soundings of 4 to 5 fathoms, sand and shells. The best anchorage is in 6 fathoms, with the natural granite pier, on with Marcus Island, bearing S. by W., where ships are completely sheltered. Good water is plentiful now. The Bay is well adapted for commercial purposes, and for ships requiring repairs; but it has no lights. Bullocks and sheep are at moderate prices. Plenty of fish may be caught with the seine in Reets (sandy) Bay: hook and line must be used in other places. The islands swarm with wild rabbits.

Tides.—The tides rise 6 or 7 ft. H. W. at 2 h. on F. and C. of moon.

Between Saldanha Bay and Table Bay regular soundings extend from the land several leagues. From Dassen Island to Robben Island, the depths are from 50 to 60 fathoms about 4 or 5 leagues off; and about 50 fathoms 10 m. to the N.W. of Robben Island.

Dassen or Coney Island, with centre in lat. $33^{\circ} 26'$ S., lon. $18^{\circ} 6'$ E., is about 8 leagues S. of Saldanha Bay, and midway from that to Robben Island; and 4 m. from the main. It is low and sandy; dangerous and rocky for a mile off on all sides, except the central part of E. side, where there is anchorage in 16 fathoms, with centre of island W. $\frac{1}{2}$ S. In addition to the reef, a sunken rock lies S.S.W. $\frac{1}{2}$ W., $1\frac{1}{2}$ m. off the S. end. There are from 20 to 26 fathoms close to the reefs on the W. side of this island, and 30 fathoms not far from the sunken rock.

Whatever guide the bank of soundings may be to ships beating between Saldanha and Table Bays, great caution is requisite when standing towards this island at night, especially if blowing fresh with a heavy sea on, when the difficulty of obtaining correct soundings is great. Between Dassen Island and Table Bay the water has a black appearance. At 2 or 3 leagues off shore an eddy current sets to the S.; when a little to the W. of the bank of soundings, it sets N.W. This part of the coast is of moderate height, and sandy near the sea; the interior is higher.

ROBBEN ISLAND, lying to the N. of Cape Town, at 5 m. N. by E. from Green Point, is a low, flat, island, bounded by reefs, and the sea breaks heavily upon the W. extremity of the rocky ground in fresh winds from S.W. to N., in 5 and 10 fathoms. The N.E. side of the island is free from danger, but the E. shore is fronted by a rocky shoal, which is well marked by an abundance of sea-weed. There is a landing cove on the S.E. side in fine weather, for convenience of the lunatic establishment, but the best landing is in Murray Bay, on the N.E. shore of the island. There is tolerable anchorage for a large vessel on the N.E. side of Robben Island, sheltered from winds between W.S.W. and N.W., in 8 or 9 fathoms, sand; with extremes of island bearing from N.W. to S.W. Small vessels may bring the S. point of island to bear S.W. by S. in 5 or 6 fathoms. Closer to the shore than this the ground is rocky. Murray Bay, which has a sandy beach, where landing can be effected, will bear W. by N. $\frac{1}{2}$ N. from the anchorage.

Light.—Robben Island has a light-house at its S. end, in lat. $33^{\circ} 49'$ S., lon. $18^{\circ} 22\frac{1}{2}'$ E., which exhibits a *fixed* light, 154 ft. high, visible 20 m.; the light-house is 60 ft. high and has Red and White bands. Variation of compass 30° W.

The channel between Robben Island and the main (opposite Blauwberg, 745 ft. high), is $2\frac{1}{2}$ m. in width, with soundings from 7 to 10 fathoms. To the E.S.E. of Robben Island the shore has white sand-hills, 100 to 200 ft. high; it then curves slightly for 6 m. to Salt River. This coast is deceptive to vessels standing in at night or in hazy weather, from the resemblance the sand bears to the water. From this cause many vessels, *disregarding the lead*, have been stranded midway between Blauwberg and Salt River. This river, very dangerous in winter, being an extensive quicksand, has two mouths: one at 3 m. to S.E. of Mouillé Point light-house; the other (best in winter) at $3\frac{1}{2}$ m. to E.S.E. from Mouillé Point, is fronted by a rocky reef, about $\frac{1}{2}$ m. off shore. The sea

breaks over this spot in $3\frac{1}{2}$ fathoms, after heavy N.W. gales. With this exception, the water shoals regularly from 8 fathoms to the sandy beach between Blauwberg and Salt River. The Tigerberg, a range of hills 1,300 ft. high, stands 5 m. within the E. sandy shore of Table Bay. Except Blauwberg, these are the only elevations in the bay N. of Table Mountain.

Whale Rock, with 6 ft., on which the sea breaks, except when very smooth and at high water, lies S. one mile from Robben Island. This danger is distinguished by the sea-weed, which adheres to the rocky bottom. Between the rock and the island there is a passage $\frac{1}{2}$ m. in width, with depths from 5 to 7 fathoms, rocky ground. This channel should never be attempted by a sailing vessel, except in emergency, as currents are sometimes strong and uncertain in their direction about the rock.

TABLE BAY is easily known by the high land, which, when seen from a distance at sea, appears like an island. Table Mountain, the most lofty part of this land, elevated 3,580 ft., is level on the top, and with a sheer drop at the E. end, till it joins the Devil's Peak, a rugged peak, 3,376 ft. high, and separated from the former by a gap. The N.W. end of Table Mountain also has an abrupt declivity uniting with the base of a conical mountain, called Lion's Head, which is about 2,160 ft. high. From the N. side of Lion's Head a ridge extends to the N.E., where it reaches to 1,150 ft. in height, and is called Lion's Rump, upon which is a signal station. This overlooks Green and Mouillé Points and the W. shores of the Bay. To the E. of Table Mountain and Devil's Peak, lies the low sandy isthmus between Table and False Bays. From Table Mountain towards the S. extremity of Cape of Good Hope, the land is high and uneven.

Lights. A square light-house stands upon Green Point, in lat. $33^{\circ} 54'$ S., lon. $18^{\circ} 24'$ E., the W. extreme of Table Bay, and 5 m. to S. of Robben Island. The light is *flashing*, every 10 seconds; elevated 65 ft.; visible 12 or 13 m. in clear weather.

A *fixed Red light* on Mouillé Point, the N.W. horn of Table Bay, and $\frac{1}{2}$ m. to E. by S. of Green Point, is 44 ft. above high water, and visible about 7 m. off in ordinary weather. The N. wharf has also a small *Red light*; the S. wharf has a small *Green light*, exhibited only during N. gales. The Breakwater extremity is also marked by a *Green light*, which is only seen from the Bay, and when bearing to the W. of a S. and N. line drawn through it.

Water. There are several water-tanks in Table Bay for the convenience of shipping; the water is excellent and abundant, and may be obtained without delay.

Time-Balls. The Cape Observatory is in lat. $33^{\circ} 56'$ S., lon. $18^{\circ} 28' 45''$ E., about $1\frac{1}{2}$ m. from the beach in the S. part of Table Bay. A ball drops from a flagstaff near it every day at 1 p.m. (Sunday excepted), Cape mean time; but as this is not visible from the whole anchorage, a time-ball has been established at Lion's Rump signal-station, to command the entire Bay, and it falls as near as possible with Observatory ball. By subtracting one second from time of signal at Lion's Rump it becomes identical with Observatory signal. The time of observation is at the commencement of the fall.

Lon. of the Observatory, E. of Greenwich, $18^{\circ} 28' 45''$ E.	...	^{h.} 1	^{m.} 13	^{s.} 55
Greenwich time at 1 p.m. at the Cape	11 46	5

Winds and Weather. Summer at the Cape is from Oct. to April, when it is safe for ships to lie in Table Bay. N.W. gales are experienced here in every season of the year, but they seldom blow home in Table Bay from Nov. to May. Such a mountainous sea is forced into this Bay by some of these N.W. gales that the anchorage becomes exceedingly dangerous. Therefore a ship coming here in winter months ought to be furnished with good ground tackling, as many vessels, with their crews, have suffered, more particularly in June and July.

The prevailing winds in Table Bay and near the Cape of Good Hope are from the S.E. and S. during summer. S.E. winds blow more or less in every month, and generally bring settled weather. N.E. winds are less frequent than any, and never continue long. In May, June, July, and Aug., the W. and S.W. winds blow strong, attended often with fogs and cloudy weather; but N.W. winds are most violent in these months, frequently blowing in severe storms for several days, with a cloudy sky, and sometimes with lightning, hail showers, or rain.

When Table Mountain, in summer months, begins to be covered by a white cloud, it indicates a strong S.E. or E S E. wind. In Jan., Feb., and March, these winds blow sometimes with great fury over the Table and Devil Mountains, and through the gap between them. On these occasions vessels not well moored are liable to drive and bring both anchors ahead. Vessels have been driven from Table Bay by these S.-Easters with all their anchors down, not regaining the anchorage for five or six days. When Table Mountain is free from clouds the S.-Easters will be moderate, and a

gentle sea-breeze then generally blows in on the W. side of the Bay, while a fresh S.E. wind prevails on the E. side of it half-way across, during most of the day.

When strong S. winds are coming on, the tops of False Bay Mountains become covered in rapid succession from the S.; but seldom remain covered throughout the gale.

Temperature of the winter months,—June, July, and Aug.,—is 55°. The prevailing winds are from N.N.W. and W.; occasionally from S.W., and they are generally accompanied by rain. Hail-storm squalls are usually from S.W. As seen from the Observatory, the first indication of a N.-Wester is a mass of vapour rolling over Lion's Hill and enveloping the signal-station; also, the air feels damp, and a swell sets into Table Bay; the tops of the ridges bordering the shore in the direction of Hout Bay become covered, and next, but not always, Table Mountain.

Strong winds with squalls and showers, more or less heavy, follow these harbingers; and fogs, which now cover the elevations, are of the usual European cast. The duration of a N.W. wind fluctuates between two days and a week, sometimes ten days. Low fogs occasionally occur (above which the tops of mountains, high hills, and topmasts of ships are visible), and are dispersed by the heat of the sun. In the fair-weather season, regular sea-breezes from S.W. and W. prevail in the morning, and continue till noon or longer. These are followed by strong S.E. winds from the land, which blow fresh during the afternoon, and frequently till the following morning.

Tides. It is H. W., F. and C., in Table Bay at 2 h. 40 m.; the rise of tide is from 5 to 6 ft. There is no sensible stream of tide, either in the Bay or on the adjacent coast. The time of high water, and its rise, is the same at Simon's Bay, and all bays along the coast from the Cape of Good Hope to Cape Agulhas.

A current, of from half a knot to 2 or 3 knots an hour, sets to the N. past Table Bay and Robben Island; but during winter months, when N.W. winds prevail, a current sets to S.E. into Table Bay, towards the mouth of Salt River, off which it divides; part going N. along shore past Blauwberg, the rest curving back to the W. round the shore of the Bay, past the Castle and to the N. towards the breakwater. In the summer season, particularly during S.-Easters a gentle stream sets round Mouillé Point to the S.S.E. into the Bay, and then out to N. along the Blauwberg beach, as in winter.

PORT INSTRUCTIONS. Vessels discharging or receiving on board much merchandise will be berthed by the port captain as close to the jetty or other landing-place as safety will admit. The vessel must then be moored with two bower anchors, with open hawse to the N. Vessels touching for water and refreshments may ride at single anchor in the outer anchorage; 70 or 80 fathoms of cable should be veered out, as the chance of fouling or starting the anchor or breaking the chain will thereby be much lessened. If riding by a hemp or coir cable, a stream or kedg should be laid out to steady the vessel; and the other bower anchor should be kept ready to let go. It is recommended that vessels be kept as snug as possible, for the periodical winds blow occasionally with much violence. The sheet anchor should be always ready for use, and strict attention paid to keep the hawse clear; the more so when the wind is expected from N.

The following signals will be shown when, from local experience and good barometers, a severe gale is expected. They should be promptly observed when made from the port office; and any neglect or departure from the foregoing instructions will be reported to Lloyd's agents, as also to owners of vessels disregarding signals.

GENERAL SIGNALS.

White pierced blue, over union-jack.—Clear hawse, and prepare to veer cable.

Union-jack over white pierced blue.—Veer to a whole cable, and see the third anchor clear.

Blue, white, blue, horizontal, over union-jack.—Down top-gallant yards and masts, and point yards to the wind, and see everything clear for working ship as far as practicable.

Union-jack over blue, white, blue, horizontal.—Strike lower yards and top-masts, and rig in jib booms.

Union-jack over No. 3, white and red, vertical.—Shorten in cable to same scope as when first moored.

When it is considered necessary to make any of the above signals, it is strongly recommended that all commanders immediately repair on board their respective vessels, and that the above signals be answered by hoisting the answering pendant, or the ensign at the peak end or at any of the mast-heads.

The above signals will be repeated from the Lion's Rump signal-station.

Vessels having Marryat's code of signals can make their wishes known to their agents in blow-

ing weather, through the port office, and any assistance required will be strictly attended to. Vessels not having the code can make the following with their ensigns:—

- 1st. Ensign in the fore-topmost rigging.—I am in want of a cable.
- 2nd. Ensign in the main-topmast rigging.—I am in want of an anchor.
- 3rd. Ensign in the fore rigging.—I have parted a bower cable.
- 4th. Ensign in the main rigging.—I am in want of an anchor and cable.
- 5th. Wheft where best seen.—Send off a boat.

The Breakwater has a *fixed* Green light at its tip, which is 6 cables to S.E. of Mouillé Red light, and may be passed quite close. Anchorage is in 6 fathoms, about 4 or 5 cables to S.E. of the Breakwater, with the Red and Green lights in one. The South Wharf by the castle shows a *Green* light, which will only be lit during N. gales. Vessels parting from their cables during a N. gale, and unable to work out, should run for the light, and beach close to the S. of the castle ditch, the crews remaining by their vessels, by which means little or no danger of life is to be apprehended. It is also recommended that, in case of such vessels taking the ground, any after-sail that may have been set in running for the beach should immediately be taken in, keeping the foresail or fore-topsail set, as the case may be, until the vessel is firmly grounded.

The following signals may be made from the most convenient point to vessels that be stranded:—

In day-time, a number will be shown, white upon a black ground. At night, the number will be shown transparent.

No. 1. You are earnestly requested to remain on board until assistance is sent; there is no danger to life.

No. 2. Send a line on shore by cask, and look out for line from rocket or mortar.

No. 3. Secure the rope; bend a warp or hawser to it, for us to haul it on shore for the boat, or for us to send you a stout rope, to be made fast to some firm part of the wreck, that we may haul off a boat for bringing you on shore.

No. 4. Life-boat will communicate at low water, or as soon as practicable.

No. 5. Have good long lines ready for life-boat, and prepare to leave your vessel; no baggage will be allowed in the life-boat.

ANSWERS TO THE ABOVE SIGNALS.

By Day. A man standing on a conspicuous part of vessel, shall wave his hat three times over his head. By Night. A light will be shown over the side of vessel, where best seen.

DIRECTIONS. During summer, vessels should shorten sail before hauling in for Green Point, as S.E. winds blow hard on opening Table Bay. Ships entering, with a press of sail, have had to let all fly to save their masts. If obliged in a S.E. gale, to bear up from Green Point to seek shelter under Robben Island, care must be taken to avoid Whale Rock, and the vessel should anchor N.E. of that Island, as before directed, coming to under easy sail. With precaution, there is little probability of a ship losing an anchor in bringing up in this place of shelter. Should she part in trying to bring up during a S.E. gale, there is an open sea to leeward.

By Day. During daylight a vessel may round Green and Mouillé Points in 10 fathoms water; but her distance is not easily guessed when off these Points, which are low, and fringed with outlying reefs. It is, therefore, advisable to give them a berth of at least $\frac{1}{2}$ m., until Mouillé Point Light-house (Black and White bands) is passed, when she may be boarded by the port-boat, and a berth given by the harbour-master. Should a stranger arrive without being boarded, he may anchor in 6 fathoms to the S.E. of the breakwater, with Mouillé Point and it in one, and the castle between S.W. and S.W. by S., and wait for a proper berth being pointed out. From this position, the signal-staff on Lion's Rump will bear W.

Large ships may anchor in 9 or 10 fathoms, with Mouillé Light-house W. by N., Amsterdam Battery half open to left of the breakwater tip, and the Observatory S. by E. $\frac{1}{4}$ E. Vessels in the summer season should moor rather taut, with 100 fathoms on the S.E. anchor, and 40 fathoms on the N.W.; in the winter with 100 fathoms on the N.W. anchor. In dark or hazy weather, ships should use the lead in standing into Table Bay; without doing so, some vessels have sailed upon Green and Mouillé Points without seeing land, whilst their masts were seen over a fog from elevated ground at the foot of Lion's Rump. Fogs that obscure the lights are frequently confined to low ground in the vicinity of Green and Mouillé Points, extending upwards only 100 to 150 ft. Therefore, it is advisable to send a mast-head man aloft, who will probably see land invisible from the deck.

The Lead should never be neglected in entering Table Bay, the average depth between Green Point and Whale Rock being 12 and 14 fathoms; and the mid-channel depth is greatest, 20 fathoms only, from which, towards the beach, soundings gradually decrease. The bottom is foul and rocky to the N.W. of a line drawn through Lion's Head and Rump; but E. of this it is clear, and a vessel may, if necessary, anchor in any part in from 8 to 10 fathoms, sandy bottom.

By Night. To enter Table Bay at night from the N.W., or outside Robben Island, the Green Point *flashing* light should be kept about S. by E. till soundings are obtained under 20 fathoms, at rather more than 1 m. from the light; then steer E. by S. or E.S.E., not coming under 14 or 15 fathoms, till Mouillé Point Red light bears about S. by W., and Green Point Light W.S.W.; now steer S.E. by S., not shoaling under 9 fathoms at H. W., or 8 fathoms at L. W., until the Breakwater Green light is seen on the starboard bow; then haul up to S. by E., passing it at 2 cable lengths, and anchor in 6 or 7 fathoms, about 4 cables to E.S.E. of the breakwater.

Entering Table Bay from the N., inside Robben Island, keep Green Point Light about S.W. by S. until past Robben Island, with the lead going. In passing this island, soundings in 6 or 7 fathoms may be obtained, when the Robben Light bears between W. and W.N.W. When the water deepens to 11 or 12 fathoms, steer about S.S.W. for the anchorage. The light on Mouillé Point bears S.S.W. $\frac{1}{4}$ W. from the fair way between Robben Island and the main. In beating between Robben Island and the main, the soundings shoal regularly towards the island. When approaching the main, it is necessary to tack at the first cast of the lead in 8 fathoms. It is not prudent to enter Table Bay by this channel, on account of the N. current. (*See Tides, page 68.*)

Entering the Bay from the S.W., a ship should not approach land nearer than 2 or 3 m., until Green Point Light bears S.E., nor pass that nearer than 1 m. in 15 fathoms. She may then steer E. by S., until Green Point Light comes abeam; not shoaling under 12 fathoms, till it bears S.W.; then haul up to S.E. When it bears W.S.W., steer S.E. by S., and proceed as before directed. The lead must be kept going, and the chart of the Bay consulted.

Strangers are recommended not to beat into Table Bay at night, especially in squally or thick weather. There is difficulty in judging the distance of lights situated under high land. Therefore, the prudent course for a stranger is to keep off and on outside till daylight, sufficiently to the W. of Green Point, to prevent being becalmed near the land, and being set in upon the coast by the heave of sea.

Vessels leaving Table Bay, bound N., should go out between Robben Island and the main. Current is almost constantly setting to N. through this channel, and in summer a fresh S.-Easter frequently blows, whilst at a few miles to the W. of the Island the wind is light and baffling under the lee of Table Mountain, or fails altogether.

The Cape peninsula, viewed from sea, appears high and rugged from Table Mountain to within 4 m. of Cape of Good Hope, where the mountain-chain terminates at Paulsberg. From Paulsberg to Cape Point the land is elevated and even, with the exception of two peaks at its S. extremity; on the S.E. peak the light-house now stands, more than 800 ft. above sea.

From the W. end of Table Mountain, a high ridge of mountains, called the Twelve Apostles, extends in a S.W. direction, towards Hout Bay. They present a steep face to seaward, and are terminated by a conical hill, similar to the Lion's Head, but not so high, and having at its S. slope a conspicuous white sand-patch. To the S. of this, about $1\frac{1}{4}$ m., rises a lofty rugged hill, called Suther Hill, with sharp peaks on its S. side, marking the N. point of Hout Bay, which is 12 m. from Green Point. From Green Point to Hout Bay the water is deep at a mile from shore; but with several outlying rocks within that distance. Two of these, to the N. of Camp Bay, are awash, with 7 and 9 fathoms water close around them. Vessels must therefore give the shore a berth of 2 or 3 m. in proceeding to and from Table Bay, for inside this distance the wind is baffling and light, from the close proximity of high land.

HOUT BAY, 12 m. S.W. of Green Point, is an indentation in the coast-line, 2 m. in depth, and 1 m. in width at its entrance. The N. shore is low and marshy, with a stream of fresh water running through it. The Bay affords good shelter from all winds to ten or twelve vessels, and is safe to approach by daylight. The only dangers about the entrance show themselves, and in rough weather constantly break. The summit of a remarkable peak, Constantia Berg, upwards of 3,200 ft. in height, seen over the high cliffs, bearing E. $\frac{1}{4}$ S., leads directly to the Bay. A few sunken rocks lie 3 cables off shore, to the W. of Chapman Peak (a high dark peak, the S.W. end of Constantia Berg range,) but they do not obstruct the safe navigation of the Bay.

W. and S.W. gales bring in a swell, which does not, however, endanger vessels lying here; it only causes them to roll, if at the outer part of the anchorage. This Bay has strangely been unnoticed as a place of shelter or refuge, especially to steamers. Sailing ships might need steam-tugs, on account of variable winds and strong gusts from the shore. The space inside available for

anchorage, in from 3 to 7 fathoms water, is over a square mile, and the narrowest part of the entrance is $\frac{1}{4}$ m. in width. There is abundance of fresh water, and the valley at the head of the Bay could produce refreshments for shipping. It is admirably adapted for a coaling station for steamers, especially during war.

Vulcan Rock, lying 1 m. off the N. point of Hout Bay, is awash at high water, and closely surrounded by sunken rocks. Between it and the shore the ground is foul, with shallow water, making it dangerous for a ship to attempt this passage. The *Abercrombie Robinson*, East Indianman, having drifted close to the rocks in a fog, passed inside the Vulcan in 1891, with soundings from 8 to 13 fathoms; but this was a case of necessity.

Slangkop Point, the S. point of Hout Bay, lies 4 m. W.S.W. from Chapman Peak, the curved sandy shore between forming Chapman Bay. Immediately at the back of Slangkop Point, the cliffs rise to the height of 300 to 400 ft. The point is low at the beach and rocky, with sunken reefs extending W.N.W. for $1\frac{1}{2}$ m.; the sea breaks over this rocky ledge only in W. winds, when there is usually a heavy swell. From Slangkop Point, for $5\frac{1}{2}$ m. to the S. to Kromme River, the coast becomes higher and rugged; thence to Cape of Good Hope, it is 300 to 400 ft. above sea, and tolerably regular in outline.

CAPE OF GOOD HOPE. The S. extreme of the Cape peninsula has two sharp peaks, 1 m. apart; S.S.E. and N.N.W. from each other. Vasco de Gama, the N.W. one, is 880 ft. in height. The other is 800 ft. high, and surmounted by a light-house. Variation of compass, 30° W.

Light. Cape of Good Hope Light-house, standing on Cape Point, in lat. $34^{\circ} 21' S.$, lon. $18^{\circ} 29\frac{1}{2}' E.$ of Greenwich, is of iron, 30 ft. high, and *White*. The light is *revolving*, of the first order, which shows a bright face for 12 seconds once every *minute*; 816 ft. above the sea, and in clear weather visible about 36 m. Vessels, coming from the N., will not see it when bearing S.S.E. $\frac{1}{4}$ E.; then it is obscured by the intervention of Vasco de Gama Peak.

Vessels approaching Cape of Good Hope from the W. will, if the weather be clear, make Cape Point Light 36 m. off, unless it should happen to bear S.S.E. $\frac{1}{4}$ E. as above. Caution is therefore necessary when making the land at night or in hazy weather. Should it happen that a ship is found near the land at night, and the light not visible, she must be instantly steered to the S.W. until her position is ascertained by the light being seen. Were a N. course adopted, she might run on shore. If bound for Table Bay from the E., after rounding Cape of Good Hope and passing Slangkop Point, you should not shut in the light with that point, until Green Point Light become visible, which will be on an E.N.E. bearing. This course will lead about 2 m. to the W. of Vulcan Rock, off Hout Bay. A course for Table Bay may then be shaped with safety.

Cape Maclear S.W. Reef, which breaks only with a heavy swell, lies nearly 2 m. W. from the light-house.

Dias Rock, small, and about 12 ft. high, is detached from the cliff to S. of the light-house, but connected with the point by sunken rocks. Ships may round this rock at $1\frac{1}{4}$ or 2 cables distant.

Bellows Rock is awash, and always breaks. The water is deep close to the S.W., except where there are sunken rocks about a cable distant. From it the light-house bears N.N.E. $\frac{1}{4}$ E. 2 m.

Anvil Rocks. These three rocks have probably 14 to 18 ft. water over them, with 15 to 20 fathoms close around. Breakers show upon them only at L. W., and with a heavy swell. The outer or S. rock has the light-house bearing N.N.W. $1\frac{1}{4}$ m., and the Bellows Rock W. by S. about $1\frac{1}{2}$ m. Vessels should not pass inside the Anvil and Bellows, unless with a commanding breeze.

The offing W. of the Cape peninsula has not been thoroughly sounded. At 4 m. from shore, between Green Point and Hout Bay, there is no bottom at 40 fathoms; but from Slangkop Point to the Cape the water is less deep. The depths vary from 24 to 10 fathoms, rocky bottom, at 1 to 2 m. off shore. The precaution, therefore, of using the lead when approaching the Cape should never be omitted.

As the wind seldom, if ever, blows from the E. or N.E., sailing vessels bound either for Table Bay or round Cape of Good Hope, should ensure a weatherly position to the N. or S., according to the season of the year. Vessels for Simon's Bay have been detained for many days by S.E. winds off the Lion's Head and Hout Bay, in consequence of making land too far to the N. during summer. The same winds would have been fair for them had they been 30 m. farther S. On the other hand, a vessel bound for Table Bay in the winter, will find difficulty in making her port from any position near Cape Point during the prevalence of N. and N.W. winds, notwithstanding the general prevalence of a N.N.W. current from Cape of Good Hope.

Vessels from the E. should not bring the Cape Light to bear more W. than N.W., which will clear all danger off Point Mudge and Cape Hangklip. A tongue of low land stretches from this

Cape to S W. for nearly $1\frac{1}{2}$ m., rendering caution necessary in passing Hangklip in hazy weather, especially if bound into Simon's Bay.

Steam vessels usually pass between Dias Rock and the Bellows and Anvil Rocks, if bound into Simon's Bay from the W. To avoid the S.W. reef, off Cape Maclear, do not bring Bellows Rock to the S. of S.E. until Dias Rock bears E. by N., or until Cape Maclear is midway between the gap which separates the light-house from Vasco de Gama Peak and that peak itself; then steer so as to pass $1\frac{1}{2}$ to 2 cables' lengths S. of Dias Rock. Should a vessel strike on any of the outlying reefs, and become in a sinking state, there is a small sandy cove between the light-house and Cape Maclear, in which she may be beached with greater safety than on any other part of the adjacent sea-coast.

FALSE BAY. The entrance between Cape of Good Hope on the W., and Cape Hangklip on the E., is 16 m., on a S.E. and N.W. bearing. The Bay extends to the N. inland about 18 m. There are several dangers in it. The middle and E. sides are considered free from danger, but the bottom is foul, and generally unfit for anchorage. On the W. shore of False Bay, at 2 m. to the N. of Cape Point, is Buffal's Bay, marked by a white sand-patch. On the ridge of hills behind Buffal's Bay a *black* beacon is erected, and shows out clearly as a mark for Whittle Rock. A *white* beacon, for the same purpose, also stands near the sea, just to the N. of the Bay. The depth of water is 4 or 5 fathoms, near the shore, and in a N.W. breeze a vessel may anchor off it in 8 to 10 fathoms; if unable to beat to windward, this is preferable to going to sea. There is a fishing establishment and a landing-place in the Bay. Smithswinkle Bay is $3\frac{1}{4}$ m. farther N.; off both horns of this Bay rocks project $\frac{1}{2}$ m. from shore. From this to Oatland Point, which is N.N.E. 7 m. from Cape Point, the coast is lofty and steep, the hills rising to the height of 2,200 ft. almost abruptly from the sea. Several rocks lie $\frac{1}{2}$ m. from the shore, with deep water about them, the principal of which are off Oatland and Rockland Points. From Oatland Point to Noah's Ark, at the S. horn of Simon's Bay, the hills recede a little from the sea, and the coast is steep to 3 cables from shore. On the summit of the hills, a mile to N.W. of Simon's town, a patch of rock has been whitewashed; and on the slope of Signal Hill, on the S. side of the Bay, a *white* beacon, with staff and ball, has been erected; these marks in line point to S.E. by S., the position of Whittle Rock.

Whittle Rock, a patch 3 cables across, with 12 ft. water at low spring tides on the shoalest spot, lies N.E. by E. 7 m. from Cape Point Light-house, and from Roman Rocks Light-house S.S.E. $6\frac{1}{4}$ m. It seldom breaks, and then only with a heavy sea and at L. W. The marks for this danger are the beacons in Buffal's Bay in line bearing W. by S., and the whitewashed patch and beacon over Simon's Bay N.W. by W.

The Admiralty Chart of Table Bay to Cape Agulhas, No. 2082, should be in the hands of all captains likely to touch at the Cape of Good Hope.

SIMON'S BAY is 11 m. N. by E. from Cape Point and near the N.W. corner of False Bay. From April to Sept., when Table Bay is considered unsafe, ships usually put into Simon's Bay. Heavy S.-Easters cause a surf on the shore of the Bay, but ships ride safely. Although open to E. and N.E. winds, these never blow strong, so that it is a safe retreat for vessels at all seasons. Ships in this Bay receive refreshments and provisions from the interior and from Cape Town, distant 22 m. Water is obtained with ease in tank-vessels, and is excellent. A patent slip is now at work, on which ships of 1,500 to 2,000 tons may be hauled up for repairs. There is an electric telegraph to Cape Town, thence to Paarl, Stellenbosch, and Wellington. Simon's Bay is an accessible harbour in the winter months for distressed ships, and with the advantages of a patent slip and the projected dock, it has every prospect of taking rank as one of the first harbours in the colony.

Caution. There is a fish in Simon's Bay commonly called toad fish; about 6 inches long; back dark, with deep black stripes; belly white, with faint yellow patches; it swims near the surface, and is a constant attendant on lines employed fishing. When taken from the water, it puffs out considerably. Should any portion of the fish be eaten, *death* ensues in a few minutes.

Time Signal. A circular disc, attached to a lever arm working on a mast, close to Simon's Town Telegraph Office, gives to vessels in Simon's Bay at the instant of 1 p.m., Cape Observatory mean time. At 55 minutes past noon the disc is raised to a right angle with the mast, and it falls at the instant of 1 p.m. The lat. of the Time Signal is $34^{\circ} 11' 30''$ S., lon. $18^{\circ} 25' 45''$ E., or in Time 1 h. 18 m. 43 s. E. of Greenwich, and it is 12 seconds W. of the Cape Observatory.

Iron and other vessels desirous of testing their compasses, to ascertain the local attraction, will find it convenient to use a conspicuous sharp peak near Cape Hangklip, instead of having a party on shore taking simultaneous observations. The true bearing of this peak from the anchorage is S. 71° E.; and as the peak is 22 m. distant, the bearing will not be affected by change of position of the vessel in any part of the anchorage.

ROMAN ROCKS LIGHT-HOUSE is on a rock out of water, surrounded by others awash, and by foul, rocky ground. It stands N.E. by E. $\frac{1}{2}$ m. from Noah's Ark, and exhibits a *revolving* light which shows a bright face for 12 seconds every *half-minute*; 54 ft. above mean level of sea, and in clear weather seen at 12 m.

Castor Rock, detached from Roman Rocks, lies N.N.E. $\frac{1}{2}$ E., $1\frac{1}{2}$ cables from the light-tower. It has only 15 ft. of water on it, and is marked by a beacon, with a flag, having the word "Rock." Between the Rock and light-house there are patches of 19 and 24 ft. water. To avoid these dangers vessels of large draught, passing to N.E. of the light-house, should give it a berth of $3\frac{1}{2}$ cables before hauling into Simon's Bay.

Noah's Ark, a large flat-topped rock, lies off the S. point of Simon's Bay. From it, in a N.N.W. direction, for $3\frac{1}{2}$ cables, the ground is shallow and foul, terminating with Phoenix Rock, which has but 3 ft. water over it; this danger is marked by a beacon, lying N.N.W. half a cable from it, with the word "Rock" on its flag. Close round Noah's Ark the water is deep, save on the N.E. side, where, at 30 yards off, there are $2\frac{1}{2}$ fathoms. **Wharf Rock**, in 9 ft. of water, lies 130 fathoms E.N.E. of the Simon's Town jetty. It is marked by a buoy, with the word "Rock" on it.

Seal Island, a low rocky islet, $\frac{1}{2}$ m. in length, N. and S., stands E. $\frac{1}{2}$ S., $6\frac{1}{2}$ m. from Roman Rocks light-house. It is surrounded by sunken rocks, upon which the sea usually breaks. **York Shoal**, a sunken rock, lies $1\frac{1}{2}$ m. to S. of the island, upon which the sea only breaks in rough weather. **East Shoal** lies $3\frac{1}{2}$ m. to S.E. of Seal Island. It breaks very heavily after N.W. gales, and appears to be extensive.

ANCHORAGE. A good berth for a large ship in Simon's Bay is about 1 m. off shore, with Noah's Ark in line with Cape Hangklip S.E. by S., and the North Battery N. by W. Vessels moor in this road N.W. and S.E. from May to Sept., with the stoutest ground-tackle to the N.W.; for this being the winter season, winds prevail from that quarter, and often blow in strong gusts over the hills. From Sept. to May, the S.E. and S. winds may be expected to predominate; then the best bower should lie to the S.E.

Winds.—From Oct. to April, S.E. winds generally prevail, but not longer than 5 or 8 days at a time, and succeeded by variable winds. In Simon's Bay, as in False Bay, it frequently happens that these winds, after blowing very strong for a day and part of the night, abate towards morning, and are succeeded by a land-breeze from W.N.W. By taking advantage to weigh with the first of this breeze, a vessel may sometimes get to sea before the return of the S.E. wind. If unable to accomplish this, the most prudent plan will be to return to anchorage in Simon's Bay, or, if so far out, drop an anchor off Buffal's Bay, where ships have ridden out strong S.-Easters.

The Muzzenberg (5 m. to N.E. of Simon's Town), capped with white cloud, is the precursor of a S.E. wind; if the Hottentot Holland range (on E. side of False Bay) is also capped, the S.-Easter may be violent and last long.

From May to Oct. N.W. winds prevail, frequent gales with rain. The S.W. wind (kloof) is cold and frequently rainy, coming in violent gusts down the hills. The wind scarcely ever blows from N.E., and never with violence.

Directions. Ships bound for Simon's Bay have frequently mistaken Muzzenberg (a mountain 2,000 ft high, which rises at the N.W. corner of False Bay) for the high hill over the S. side of Simon's Bay, and have been stranded on Muzzenberg beach. Attention to the excellent lights, and keeping the lead going, should prevent this mistake. To the N. of Simon's Bay, there are four sand patches, conspicuous even at night, and in steering for that Bay they will be ahead, and on the *starboard* bow; whereas, if the vessel is steering for Muzzenberg beach, they will all be on the *port* bow. These remarks may appear unnecessary with the light on Roman Rocks; but yet several ships have made the mistake; one ran on shore, and several others were only saved by anchoring close to the beach, from which they were rescued by assistance from Simon's Bay.

Vessels from the W., bound for Simon's Bay, after rounding Cape of Good Hope, and having brought the S. end of the lofty Swartkop range (which is to N. of Smithswinkle Bay) to bear N.W. by W., should keep the light on Cape Point to the W. of S.W. by S., until Roman Rocks light bears N. by W., when they may haul towards it. By day, should the weather be hazy, and the marks for Whittle Rock indistinct, Chapman Peak brought on with Elsey Peak, on a N. by W. bearing, will lead clear but close to the W. of the Whittle. The Roman Rocks light-house, in line with Elsey Peak, bearing N. $\frac{1}{2}$ W., leads midway between the Whittle and Miller Point. By night this bearing of the light is the only guide.

Ships from the W. by day, outside the Anvil and Bellows, frequently run much further E. than necessary, to avoid the former rocks, when they do not show breakers. When Vasco de Gama Peak comes open E. of the hill on which the light-house stands, they will be to the E. of the Anvil, and may haul in N.N.E., and when Roman Rock light-tower comes in line with Elsey

Peak, bearing N. $\frac{1}{2}$ W., should steer for it, until Noah's Ark bears W.; the course should now be altered to N.W., till the block-house bears W. by S., by which time the port authorities will have boarded the ship, and will conduct her to a proper berth. If they are not on board, steer W. by N., and anchor in 9 or 10 fathoms, with the block-house bearing S. by E. The common channel for ships entering Simon's Bay is between Noah's Ark and Roman Rocks, 7 cables wide: but if the wind be N.W., the passage E. and N. of the Roman Rocks must be taken, as it affords better working space. Entering in a strong S.-Easter, shorten sail, and have *all furled* when abreast of Noah's Ark; pass between it and Roman Rocks; then round to under spanker.

If it is intended to beat into Simon's Bay E. of the Whittle, the Roman Rocks Light should not be brought to the N. of N.W. by N., in order to avoid that rock; nor to the W. of N.W. by W., so as to give a berth to Seal Island and York Shoal; nor should the Cape Point Light be brought more S. than W.S.W. But in working either E. or W. of the Whittle, short tacks should be made, until certain of being within 5 m. of Roman Rocks Light.

With a leading wind, Roman Rocks Light must be brought to bear N. $\frac{1}{2}$ W., and opened on the *port* bow, so as to round it nearly $\frac{1}{2}$ m. off. When the Light bears S.S.W., steer in W. for the anchorage, and bring up in 14 to 10 fathoms. At night, with a leading wind, all ships should pass to the E. of the Light, and haul round it to the N. and W.

Vessels bound to the eastward should leave the Bay when N.-Westerly begin to blow; if bound westward in the winter season, they ought to remain till these winds are on the decline, and get under way when they shift to W., as it is probable they will veer from W. to S.W., S. and S.E., which will be favourable for doubling the Cape.

Caution is necessary in misty weather against mistaking the light on Roman Rocks for the light on Cape Point, as they are both revolving, and only 10 m. apart. The distinction is a difference of *interval* in revolution, the light on Cape Point showing its bright face every minute, and the light on Roman Rocks every $\frac{1}{4}$ minute.

Tides. It is H. W., F. and C., in Simon's Bay, at 2 h. 44 m., springs rise $5\frac{1}{2}$, neaps $3\frac{1}{2}$ ft., and neaps range 2 ft. There is little current perceptible here at any time.

Gordon Bay, on the N.E. side of False Bay, affords shelter from S. and E. winds. As it is quite exposed to W. winds, vessels can only lie there in the summer months.

CAPE HANGKLIP, a quoin-shaped hill, at the E. point of False Bay, makes as an island in approaching from the S. Its W. face appears to overhang from some points of view, and a conspicuous sand-patch extends half-way up its S.E. side. The Cape itself, about $1\frac{1}{2}$ m. to the S. of this hill, is low, and a heavy sea always breaks upon it; but there are no outlying dangers further off shore than $\frac{1}{2}$ m.

The coast-line between Cape Hangklip and Mudge Point forms a bight, in which is Palmiet River, a rapid stream in the winter season, but its entrance is always blocked up with sand. **Mudge Point** is low and rocky; a coast range of hills terminates near it in a square bluff, which is conspicuous. There are many sunken rocks off the W. angle of the point, which, with masses of kelp about them, form the S. side of D'Urban Cove, where there is good landing in E. and S.E. winds. The gig of H.M.S. *Birkenhead* landed (after the wreck) in a small rocky cove at the S. end of Sandown Bay, by a fishing station, but landing at D'Urban Cove is better and safer.

From Mudge Point the coast goes S.E. for $4\frac{1}{2}$ m., then forms Walker Bay, having Danger Point at its S. extreme. The Bay is remarkable for immense tracts of sand and high sand-hills at its head, visible a long distance at sea. A long heavy swell always rolls into the Bay, and the water is deep within 1 or 2 m. of the shore.

DANGER POINT, S.E. $\frac{1}{4}$ E., 28 m. from Cape Hangklip, is a tongue of low, hummocky land, projecting into the sea about $4\frac{1}{2}$ m. from the base of Duinfonteinberg, a bluff hill, conspicuous from every point of view at sea. This point affords shelter from the S.E. gales of summer to ships of any size. Stanford Cove, a small rocky inlet, affords landing in E. and S.E. winds. It is in Walker Bay, 5 m. N.E. of Danger Point. There are several rocky patches off it, which, with the heavy swell, render it less available than Hydra Bay.

Birkenhead Rock, the cause of the loss of H.M.S. *Birkenhead* and 436 lives, lies about a mile from the pitch of Danger Point. There is a clear channel between it and the reef of sunken rocks off the W. angle of Danger Point. The sea breaks with violence on the rock, but often at intervals of 15 and 20 minutes.

Hydra Bay, 2 m. to the N.E. of Danger Point, is the best anchorage under that point, as farther in the swell is heavier. The Bay is easily distinguished by a sand-patch which marks the face of the hillock over it. If coming in from the S.W. to anchor in Hydra Bay, Danger Point should not be approached nearer than 2 or 3 m., when the bluff hill of Mudge Point may be steered for until the sand-patch is well open, and the rocky spit projecting from Danger Point will be

cleared. Then haul up for the Bay, and anchor in 12 or 14 fathoms, about $\frac{1}{2}$ m. from the shore, taking care to give a wide berth to a 2-fathoms rocky patch in the centre of Bay, upon which the sea often breaks.

The anchorage is with Duinfonteinberg, E.S.E.; the extreme of Danger Point, S.W. by W. $\frac{1}{2}$ W.; and the sand-patch in Hydra Bay about S.S.E.

Dyer Island, the abode of numerous rabbits, gulls, cormorants, pelicans and penguins, S.E. by S. $6\frac{1}{2}$ m. from Danger Point, is a low rocky islet, visible not far off. Geyser Island, 3 cables to S.E. by S. of Dyer Island, is smaller, somewhat higher, and the resort, in certain seasons, of seals, for killing which there was formerly an establishment on Dyer Island. These islands, with numerous rocks to the W. connected with them, form a natural breakwater, under which vessels of any size may find shelter in S. and S.E. gales.

From Danger Point to Quoin Point the coast is low near the sea, backed by bare, rugged hills of moderate elevation. A long, heavy swell constantly breaks on this inaccessible shore. About halfway between Dyer Island and Quoin Point, there are two rocks, $1\frac{1}{2}$ m. off shore, least water 4 fathoms. The sea breaks upon them when there is any swell.

Dyer and Geyser Islands, being low and white, are with difficulty seen against sand-hills on the adjacent coast. In approaching them from the S., the danger to be avoided is the reef of sunken rocks to W. of them, upon which several of H.M. ships have struck, and dangerous in fine weather, when the sea does not break. It will be cleared by keeping Danger Point on with the valley in the high land near Cape Hangklip, until Geyser Island is in line with the Quoin. Then haul up for Duinfonteinberg, and when the Quoin opens to the N. of Dyer Island, steer for the Quoin, and anchor in 10 fathoms, with the following bearings:—

Anchorage. Dyer Island (extremes), from S.S.E. $\frac{1}{2}$ E. to S.S.W. $\frac{1}{2}$ W.; Duinfonteinberg, N. by E.; the extreme of Danger Point, N.W. $\frac{1}{2}$ N.; the Gunner's Quoin, S.E.; and the nearest sandy point of the main-land bearing E. by S. The bottom is sand, and holding-ground good, but the reef affords no shelter from S.W. winds, and the anchorage is safe only as long as the wind is not to the W. of S.S.W.

GUNNER'S QUOIN is a conspicuous bluff hill, 1000 ft. in height, and 20 m. to the N.W. of Cape Agulhas. Quoin Point, a projection of hummocky land, from the base of Gunner's Quoin, is fronted by sunken rocks to a distance of $1\frac{1}{2}$ m. from shore, and distinguished, when seen from S., by two sand-hills near its W. extremity. Between Quoin Point and Cape Agulhas the coast is low and sandy, except abreast of the flat-topped range of Zoet Anysberg, where the shore is steep and rocky. The whole of it is exposed to the full force of the ocean swell, and landing upon it is impossible.

Winds. H.M.S. *Hydra* found tolerable shelter and smooth water, in a strong N.W. wind, at anchor under the lee of the reefs to the E. of Quoin Point; but dire necessity alone should lead others to try it, and only if provided with the best charts.

From Sept. to May (the Cape summer) the prevailing winds are from the S.E. These sometimes rise to gales at this season, and last for three days together, being followed by calms and light W. winds. The barometer is high and the atmosphere hazy during their continuance, with great dampness at night, and the tops of higher mountains are covered with a mantle of white, fleecy vapour. Eastward of Cape Agulhas they blow steadily from S.E. by E., but to the W. they are deflected by the land, and in False and Table Bays blow from S. or S. by E. In strength they vary at different places. The wind was light at Cape Hangklip, for instance, when ships were driving in a gale from the same quarter in Table Bay; on another occasion, a furious gale blew from S. by E. in Simon's Bay, when the *Hydra*, at anchor under Danger Point, had scarcely any wind.

From May to Sept. the winds are mostly from the W., with occasional breezes of short duration from the S.E. There is, on the whole, less wind in these winter months than in summer, although W. gales, whilst they last, are more violent than those from the S.E. The winter winds begin at W., veer to N.W., then back again to W. (when their greatest force is felt), to S.W., and S.S.W., with rain, when they moderate. Afterwards the wind goes to S., S.E., N.E., and N., and dies away. The falling barometer gives warning of their approach. (*See BAROMETER*, p. 78.)

Current. A current, setting to the N.W., about 1 knot per hour, is supposed to prevail constantly between Cape of Good Hope and Cape Agulhas. On two occasions, however, in the *Hydra* going from Simon's Bay to Cape Agulhas, an E.S.E. current of upwards of a knot an hour was experienced after passing Danger Point, and on one occasion she was set in the night to the E. quite past Struys Bay, to which the ship was bound.

Currents. During the survey of this coast, no current was observed in the bay, or about the coast $2\frac{1}{2}$ m. from shore; but it was asserted by fishermen and residents at Struys Bay, that a strong current frequently sets to the W. round Northumberland Point. A ship, becalmed in the offing,

was seen from anchorage in Struys Bay setting to the E. more than a knot an hour. On two other occasions, close to shore, about 2 m. to the W. of Agulhas Light-house, the stream ran through a whole night steadily to the N.W. at $1\frac{1}{2}$ knots per hour. These changes may be traced to the effects of the wind.

Tides. The rise of the tide (about 5 ft.), H. W. at F. and C., 2 h. 44 m., at Simon's Bay, Dyer Island, and Struys Bay, are very nearly the same, and the stream of tide along the whole coast between Cape Hangklip and Struys Bay is inconsiderable and uncertain.

CAPE AGULHAS is the rocky projection, which is the most S. part of Africa. The features of the land about Agulhas distinguish it from neighbouring headlands. Viewed from a distance seaward, E. or W., the N. and S. elevations resemble two oblong hummocks. The highest part is 455 ft. above sea, and its distance from the Cape 1 m. About 55 ft. above the sea, and $\frac{1}{2}$ m. to the N.W. from Cape Agulhas, the light-house is built, which shows well on nearing it from E. or W., but is difficult to see from S. against the higher land behind, particularly of an afternoon. Northumberland Point, a long league to E. of the light-house, forms the W. horn of Struys Bay. The whole of the beach from the W. of Agulhas promontory to Northumberland Point consists of rugged rocks, perfectly impracticable, even for a boat. A vessel touching the ground has not the slightest chance of escaping destruction.

Light. The light-house on Cape Agulhas, in lat. $34^{\circ} 50' S.$, lon. $20^{\circ} 1' E.$, is a round tower, with horizontal red and white bands alternately. It exhibits a *fixed* light of first order, placed at an elevation of 128 ft. above sea, and visible in clear weather 18 m., between the bearings S.E. by E., and round from seaward, till it bears W. only. Therefore a vessel by going too far into Struys Bay will lose sight of the light.

Caution. Vessels, approaching the Cape by night, coming from the Indian Ocean—having had (though not yet known to them) only *half* as much W. current, since previous noon, as they expected—might think they had passed Agulhas, and could stand to N.N.W. for Cape of Good Hope, when actually they were running into the shore to the E. of Struys Point, being out of the range of Agulhas Light. The lead only, on a dark night, could warn them of the danger. Steamers, in such circumstances, should steer right off shore till they see Agulhas Light, when they will be clear of dangers, and can stand on to W. with the Light just on starboard bow.

NORTHUMBERLAND POINT, 3 m. E. from Agulhas Light house, is low and sandy, with a dangerous ledge of rocks 1 m. S.E. from the Point, and a detached rock, 3 or 4 cables further to E. Thus the extremity of Northumberland Point Reef lies with the Light-house bearing W. by N., distant nearly 4 m. Nearer to the Light-house, it breaks in no place beyond $\frac{1}{2}$ m.

Struys Point is the outer extreme of a number of sand-hills, to E. of Northumberland Point 11 m., and 15 m. from Agulhas Light-house. The sea breaks on rocky ground fully 3 m. seaward from the Point. H.M.S. *Gorgon*, in Feb. 1861, when rendering assistance to the *Miles Barton*, transport, wrecked near Struys Point, anchored in $4\frac{1}{2}$ fathoms at about $1\frac{1}{2}$ m. off Hoop Point, which is about 2 m. E. of Struys. The shipwrecked troops were embarked in the *Gorgon* from a cove just to the E. of Struys Point. A fisherman stated that reefs (*blindere*) extend as far as 6 m. from Struys Point, having 3 fathoms on their extremity, and a channel of 6 fathoms between, the sea breaking upon them only in heavy S. gales. A vessel had been seen to pass inside, not being aware of the danger.

Struys Bay affords shelter in W. and N.W. winds, but is wholly unsafe in any wind from W.S.W. round by S. to E. It is between Struys and Northumberland Points. The shore of the Bay is low and sandy, with a line of sand-hills at back, varying from 50 to 150 ft. in height; some covered with dark bush, and the coast to Hoop Point is the same. There is no high land near it, like the hills N. of Agulhas.

Anchor in Struys Bay with a large stone house near beach bearing W. by S., and Northumberland Point, S.W., in 6 fathoms, sand. Here the bottom is clear, while to the W., and nearer to the reef, where water is smoother, the bottom is foul. The Light will not be visible from this anchoring-ground, owing to intervening land. The landing-place is a small cove to the N. of Northumberland Point, sheltered slightly: but not at L. W. The large stone-house, seen between the two storehouses, leads in between breakers.

Struys Bay has been the scene of several disastrous wrecks, and cannot be recommended, except as a temporary refuge in W. or N.W. gales. Vessels, taking shelter in this Bay in a N.W. gale, should put to sea immediately after it subsides, for the wind frequently changes in a few hours from N.W. to S.E. or S. in which case it is very difficult to work out, in consequence of the heavy sea that rises with these winds, which often breaks in the Bay in 7 and 8 fathoms water.

Coming from the Indian Ocean. A vessel should pass Struys Point at the distance of 5 m.

In clear weather Agulhas Light may be seen when 5 or 6 m. E. of Struys Point, and if the vessel there should chance to be close in shore (where the Light cannot be seen from mast-head), by steering even W. by S. she might run on the shoal off Struys Point. This happened to the *Queen of the Thames* steamer in March, 1871. To guard against this, when the Light is first seen, it should be brought immediately to bear W. by N.; and keeping this bearing of the Light, the vessel will be 2 m. to the S. of any danger off Struys Point.

Take care when approaching this land before the Light is discovered; for, in hazy weather, or from spray in a fresh breeze, at the distance of Struys Point (15 m.), the Light may be faint or altogether obscured, and the vessel may get within the line of danger. Therefore the lead should not be neglected; nor should any vessel shoal under 20 fathoms, without putting about immediately to the S. Like precautions are required in the daytime, particularly in foggy weather; for Agulhas high land may be invisible, while the sand-hills of Struys Bay and breakers off Northumberland Point are distinctly seen. On these occasions it is difficult to determine whether the vessel is to E. or W. of Struys Point, because the sand-hills hereabouts are all alike. Sailing-vessels, in particular, should adhere to these rules; for, if it fall calm, the heavy swell, which constantly rolls towards the shore, would carry them with it; and anchoring would probably be of no avail, on account of the rocky bottom and heavy swell.

Coming from Cape of Good Hope. The Agulhas Light will be first seen on a S.E. by E. bearing. Quoin Point bears N.W. $\frac{1}{4}$ W. 19 m. from the Light, but the Light is not visible from it. Therefore, similar precaution is necessary for a vessel off Quoin Point Reefs (19 m. from Agulhas Light), as when to E. of Struys Point. No ship should shoal under 20 fathoms. Steamers from Table Bay, going too fast to get soundings, should give Quoin Reefs a wide berth; a strong current, setting N.W. with (wind at S.), might catch them on the starboard bow, and set them near to Quoin Point, whence the Light cannot at any time be seen.

Variation of Compass at Agulhas, 80° W.

WINDS AND WEATHER.—ICE ISLANDS NEAR AGULHAS BANK.

From Sept. to April, the summer season, S.E. winds may be said to predominate near the Cape of Good Hope; and N.W. and W. winds from April to Oct., which is the winter or stormy season. But it must be observed, that the S.E. winds are more constant on and near Agulhas Bank during part of Jan., the whole of Feb. and March, than at any other time of the year. In April, also, they are expected, though in this month short gales from the W. frequently happen. In May, the winds between N.W. and S.W. prevail more than the S.E. and E. winds; sometimes blowing in hard gales along the edge of the Bank. In June, those from W. and N.W. are strong; during this month, and July and Aug., they blow with greatest force, producing very heavy seas; and were it not for the help of the W. current setting along the edge of the Bank, ships would find it very difficult to get round the Cape in these months. All ships from India, on their passage to Europe, reaching the E. part of the Cape Bank from April to Sept., should be in good condition if possible, and well prepared to resist bad weather; for they will be liable to encounter storms from W.N.W. to W.S.W., which may continue two or three days at a time, with short intervals of E. and variable winds. Many ships, by not being in condition to resist these gales, have sprung a leak, and have been obliged to bear away for St. Augustine Bay, in Madagascar, to repair their damages; several have anchored in the bays to the E. of the Cape in great distress; others have reached Simon's Bay with much difficulty, where they repaired their damages, and refreshed their crews, worn out with fatigue.

In Aug., the W. wind does not blow so constant as in June and July, although very hard gales of short duration may be expected. On Aug. 4, the *Anna* was near the E. part of the bank abreast of Algoa Bay, and got round the Cape of Good Hope on the 14th, having encountered a very severe storm of two days' continuance from W.N.W. and W., in lon. 24° E. W. winds are also frequent in Sept., Oct., and Nov. Even in Dec. ships have been beating round the Bank against W. winds during the whole month, before doubling the Cape. They had sometimes very severe sudden squalls; but in general W. gales are of short duration in this season, although they blow very strong at times.

Notwithstanding what has been mentioned above relative to winds, it sometimes happens that ships get easily round the Cape Bank to the W. in every month of the year; many have been known to get round in May, June, July, and Aug., more speedily than others in Nov. and Dec.; for the winds are often different in one year from what they are in another, even in the same month.

Around the Cape Bank, as in the open sea far to the S.W., the S.E., and the S. of the Cape, the winds in changing seldom *veer* from N. to E., &c.; but mostly *back* from N.W. to W., to S.W.

and S. After blowing strong from N.W. or W., if the wind veer to S.W. and to S., it becomes light, or is succeeded by a calm. If a light breeze continue, it veers to the S.E., where it may keep for a considerable time, but probably not above a day if it be the winter season. From S.E. it backs to E. and N.E., then to N.N.E., and to N. In the vicinity of the Bank, the N.E. and N. winds are very transitory: but in lat. 39° and 41° S. from the meridian of Cape Agulhas, to lon. 45° or 50° E., the N.N.E. winds are often experienced in both seasons, and sometimes blow steady for a day or two at a time.

There are sometimes N.W. or W. gales near and upon the Cape Bank, which blow very hard, with a clear sky; but those most to be dreaded are generally preceded by heavy black clouds rising from the N.W. and W., with sometimes lightning issuing from them, or a noise of distant thunder; shortly after, the gale may be expected to commence by sudden gusts, and sometimes heavy showers of hail, or whirlwinds from the heavy dense clouds.

When the wind at S.E. or E.S.E. shifted to N.E., the Dutch commanders were directed by their Company to take in the mainsail. If lightning appeared in the N.W. quarter, they were to wear and shorten sail; for in the first case, they expected a hard gale at N.W.; and if lightning was seen in that direction, they thought the gale would commence in the sudden shift, or whirlwind, which might be fatal if they were taken aback.

The Marine Barometer is of great utility in announcing the approach of storms near the Cape Bank, by a considerable fall of the mercury. A careful attention to this instrument, combined with the knowledge which every navigator ought to possess, by observing the appearance of the atmosphere, the surface of the sea, or the heavenly bodies, will be sufficient to warn him of the approach of these storms. Although a fall of the mercury generally precedes a gale of wind in these latitudes, the glass is seldom disturbed by hard squalls of short duration.

In the vicinity of the Cape Bank, and in most parts of the S. hemisphere, the mercury rises with S. and falls with N. winds; these last proceeding from a warmer atmosphere, are more rarefied, consequently the mercury falls in the barometer, whereas S. winds coming from the frozen regions near the pole are more dense, and cause the mercury to rise. This ought to be kept in remembrance; for, when the wind was from the S.E., Captain Horsburgh several times observed the mercury to fall considerably before the wind changed to the N., and so he expected a gale; but the fall resulted only from the warm air, coming from the N., meeting and repelling the more dense air.

The average range of barometer in higher latitudes between 50° and 60° is about 1.5 inches; but, on extraordinary occasions, ranges of 2.75 and 3.0 inches have been recorded.

In the intertropical regions the range varies from 0.4 to 0.2 inches, and near the equator it seldom exceeds 0.15 inches, this small change being in great measure due to a regular diurnal variation. The average movement of the barometer within the tropics being thus confined within small limits, any interruption of the law may be deemed a warning of the approach of bad weather.

In the South Atlantic, the effect on the barometer of the veering of the wind, is as follows:—

With E., N.E., and N. winds, the barometer falls.

„ N.W. winds, the barometer ceases to fall, and begins to rise.

„ W., S.W., and S. winds, the barometer rises. .

„ S.E. winds, the barometer ceases to rise, and begins to fall.

SOUTH ATLANTIC OCEAN—MEAN BAROMETRIC PRESSURE.

Latitude.	Jan., Feb., and March.	April, May, and June.	July, Aug., and Sept.	Oct., Nov., and Dec.
	Inches.	Inches.	Inches.	Inches.
0° to 5° S.	29.90	29.93	30.00	29.94
5 „ 10 „	29.94	29.98	30.03	29.99
10 „ 15 „	29.97	30.03	30.07	30.04
15 „ 20 „	30.01	30.07	30.11	30.07
20 „ 25 „	30.06	30.08	30.15	30.11
25 „ 30 „	30.06	30.09	30.15	30.11
30 „ 35 „	30.05	30.06	30.10	30.06
35 „ 40 „	30.00	29.93	29.98	30.02
40 „ 45 „	29.95	29.91	29.95	29.97
45 „ 50 „	29.75	29.71	29.84	29.71
50 „ 55 „	29.45	29.44	29.55	29.41
55 „ 60 „	29.24	29.25	29.27	29.14

From the Cape Bank to the meridian of the S. end of Madagascar, hard gales of wind happen in the winter season, accompanied with lightning, thunder, and much rain; which sometimes prove very dangerous to ships, particularly near the land. In storms off the Cape Bank, and to the E. of it, the sea is turbulent, and they are generally accompanied with a black overcast sky. When they are about to commence, and during their continuance, numbers of albatross, petrels, and other oceanic birds, are seen flying about; although, in moderate weather, few are perceived.

ICE ISLANDS, usually called **ICEBERGS**, have sometimes been mistaken for land by ships which went far to the S. Proceeding towards India, the *Carron* went in search of W. winds, to lat. $42\frac{1}{2}^{\circ}$ S., where the atmosphere became very cold, with almost constant fogs and sleet, the sea being covered with snow petrels, indicating that the vessel was not far from ice; they were therefore glad to return into lat. 40° and $39\frac{1}{2}^{\circ}$ S. where she got speedily to the E.

Ships bound to New South Wales should be careful not to proceed too far S. in running down their easting; for in Dec., H.M.S. *Guardian*, bound outward to that place, with stores, struck against an ice island in a foggy night, in lat. $44\frac{1}{2}^{\circ}$ S., lon. $44\frac{1}{2}^{\circ}$ E. by account. She soon after nearly filled with water, and the chief part of the crew left her in the boats; but Captain Riou, and a few of the people, remained in the ship and suffered great hardships; she continued nearly full of water, and was tossed about a considerable time without a rudder, until discovered by a Dutch packet, and towed into False Bay, Cape of Good Hope, five weeks after this misfortune, where she was wrecked, by driving on shore, with several other ships, in a storm.

Ice islands seldom or never have been seen by East India ships when passing the Cape Bank in the parallels of 36° to 41° S.; yet it will be perceived, by the account of two ships, now to be narrated, that dangerous icebergs have been discovered near the Cape of Good Hope, almost in the warm temperature of the verge of current that sets to the W. along the bank; showing that greater caution is necessary than hitherto supposed, for it seems very probable, that some missing ships have been lost by striking against icebergs in the night, during tempestuous weather.

The French ship *Harmonie*, Captain Milchior, from Calcutta, bound homeward, in April, fell in with several clusters of icebergs, in lat. $35^{\circ} 50'$ S., lon. $18^{\circ} 5'$ E., some of which appeared to be 100 ft. above water and 200 ft. in diameter. She passed between two of them about 2 cables' length from the nearest large pieces of ice, upon which the sea broke violently. When among these icebergs, she spoke the Spanish ship *Constancia*, from Manila, bound to Cadiz. The French vessel passed one which seemed almost breaking up, as the surface of the surrounding sea was covered with small pieces of ice; some time after, in the dusk of the evening, she passed another iceberg, almost dissolved. The wind changed to the N.N.W. and N.W. in the night, and blew tempestuously all the following day, without any more ice being seen.

The brig *Eliza*, Captain Jucometti, from Antwerp, bound to Batavia, on April 7th fell in with five floating icebergs in lat. $37^{\circ} 31'$ S., lon. $18^{\circ} 17'$ E., having the appearance of church steeples, and apparently from 250 to 300 ft. high, which were passed within $\frac{1}{2}$ m.; and the sea broke so furiously against these enormous masses of ice, that at first they were thought to be fixed on some unknown shoal; but on sounding, no bottom could be found. Three weeks afterwards, the *Harmonie* and *Constancia* fell in with icebergs in a state of rapid dissolution, nearly on the same meridian, but 33 leagues more to the N.

It is rather remarkable that these icebergs were seen in April, which is the autumn of the S. hemisphere: whereas in March and April, which are the spring months of the N. hemisphere, the arctic or N. icebergs are usually observed, in the North Atlantic Ocean, to drift farther to the S. before they are dissolved, than at any other time of the year.

Ice Charts of the South Hemisphere have of late years been published under the direction of the Hydrographer of the British Admiralty, compiled from the voyages of Cook, Bellingshausen, Weddell, Foster, Biscoe, Balleny, D'Urville, Wilkes, and Ross, from various documents. This useful chart shows by symbols when ice-bergs have been fallen in with in different months. The graphic method is so well calculated to show at a glance where these serious hindrances to safe ocean navigation may at times be found, that we recommend all vessels, rounding the Horn or the Cape of Good Hope, to furnish themselves with these Admiralty charts,* from which we extract the following information:—

The greatest number of ice-bergs, hitherto sighted in the tracks of ordinary navigators, has been in Nov., Dec., and Jan.; and the least in June and July. Great caution should be observed in navigating the higher latitudes of the S. hemisphere in the late Spring and the Summer months. A greater probability also exists of falling in with ice-bergs in March and April than during Sept. and Oct. Diminished temperatures of both air and sea usually indicate their approach. Vessels should,

* See Admiralty Chart, No. 1241; Ice Chart of S. Hemisphere.

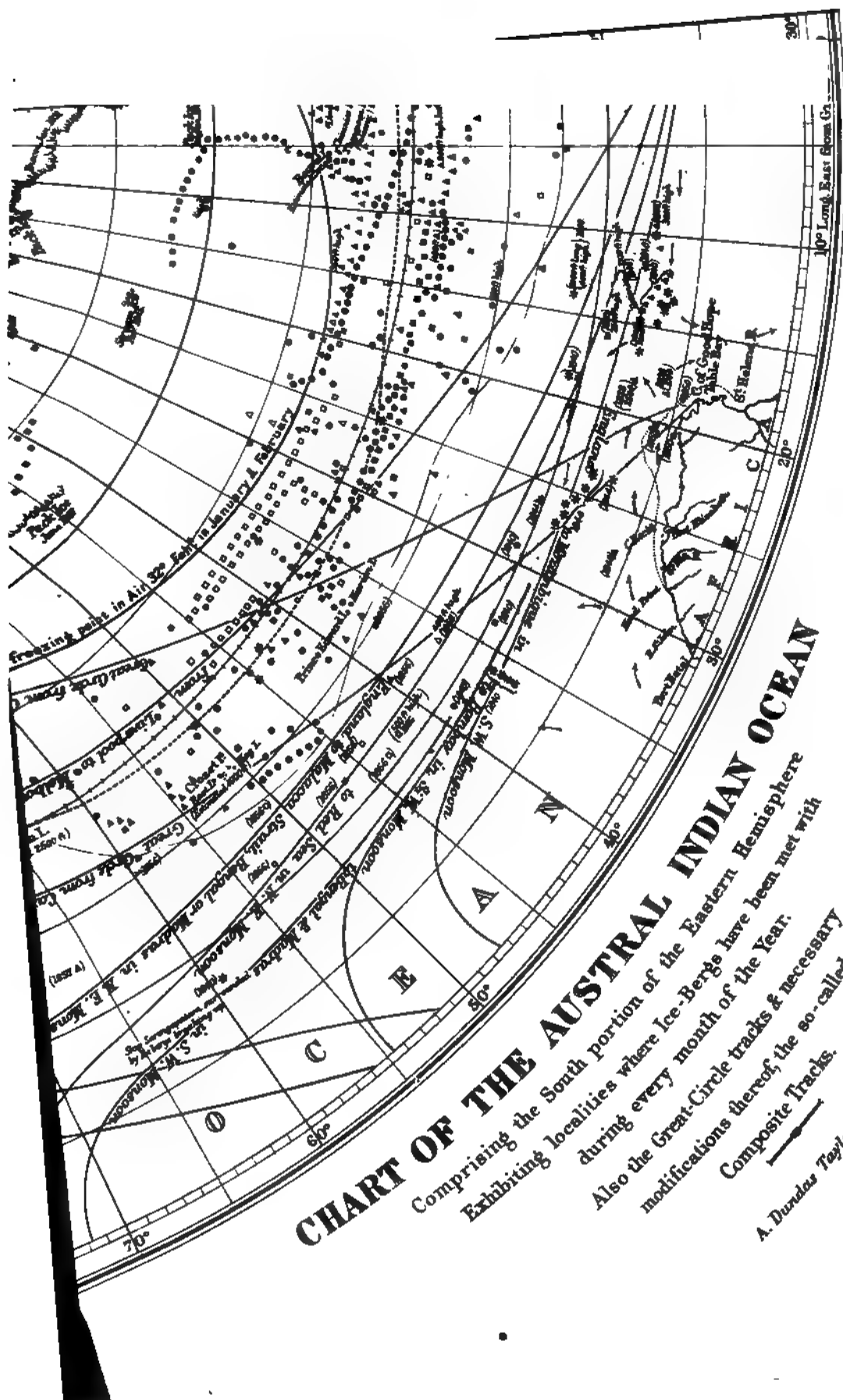
if possible, pass to windward of ice-bergs, to avoid the loose ice floating to leeward. The danger from contact with large masses of ice in the high S. latitudes, is far greater than was generally supposed before tracks were so multiplied.

This Polar chart, collecting numerous observations, defines as nearly as possible not only the boundaries of the pack-ice which encircles the S. Polar regions, but also the general limits of those vast disrupted masses or bergs, which, drifted by winds and currents to lower latitudes, have been found seriously to delay as well as to imperil navigation. The seaman must, however, bear in mind that, although ice-bergs have been actually seen, as marked on the chart in certain spaces, it does not follow that the same conditions invariably exist; for, while some years have been remarkable for great numbers, extensive spread and drift to lower latitudes, other years have been equally so for their scarcity or absence. Scattered masses of ice having been met with at nearly all seasons, especially in the vicinity of the S. capes of Africa and America, the careful navigator will not fail, when in those localities, to observe more than ordinary caution and vigilance.

CHART OF THE AUSTRAL INDIAN OCEAN

Comprising the South portion of the Eastern Hemisphere
Exhibiting localities where Ice-Berge have been met with
during every month of the Year.
Also the Great-Circle tracks & necessary
modifications thereof, the so-called
Composite Tracks.

A. Dundas Taylor, F.R.G.S.



SECTION III.

EAST AFRICA, ARABIA AND PERSIA.

CHAPTER VI.

CAPE AGULHAS TO ZANZIBAR.

ALGOA BAY—BUFFALO RIVER—NATAL—DELAGOA BAY—CORRIENTES CAPE—SOFALA—QUILIMANE—
PRIMEIRA AND ANGOKA ISLANDS—MOZAMBIQUE—QUERIMBA ISLANDS—CAPE DELGADO—KEELWA
—ZANZIBAR.

(VARIATION AT ALGOA BAY, 30° W.; AT NATAL, 27° W.; AT CORRIENTES, 22° W.; AT SOFALA,
19° W.; AT ANGOKA, 15° W.; AT CAPE DELGADO, 12° W.; AT ZANZIBAR, 10° W.)

The Coast between Agulhas and Cape Infanta is low and sandy in some places.

Atlas Rock is small, not exceeding half an acre in extent; has 3 fathoms on it, and 6½ and 7 fathoms around it, at low water. It lies 2 m. off shore, in lat. 34° 37' S., lon. 20° 23' E., with Struys Point bearing W. ½ S., distant 7 m., and a triple isolated peak inland N.W. ½ W. The peak on this bearing appears like a cone.

Cape Infanta, nearly 800 ft. high, stands 16 leagues to E. of Agulhas Light. A deep bay extends to the W. of Infanta to Hoop Point and Atlas Rock. A vessel might get into this, whence the Agulhas Light would not be visible, even from the masthead of a lofty ship (*see* p. 77.) To the S. of Cape Infanta, soundings of 30 to 40 fathoms extend 10 leagues off shore. Sebastian Bay and Breede River are to the N. of Infanta. Capes Barraconta and Leven form the next projection of this rocky and exposed coast, the latter being 25 leagues to E. by S. of Agulhas. **Cape Vacca** is about 8 leagues to E.S.E. of Leven Point, and 5 leagues W. by S. from Cape St. Blaize. Care must be taken in rounding this low Cape at night, as St. Blaize Light is not visible from it, even from aloft. The lead will be best guide at night or in thick weather. Never shoal under 30 fathoms.

CAPE ST. BLAIZE LIGHT stands 38 leagues to the E. by S. of Agulhas. A square, white tower, on the bluff of the Cape, exhibits a Red *fixed* light, 240 ft. high, visible from 12 to 15 m., in lat 34° 11' S., lon. 22° 9' E. The Blinder or Windvogel Rock lies about ½ m. off the E. end of the Cape, and the sea breaks heavily upon it at low water. **Mossel Bay**, on the E. side of Cape St. Blaize, affords security to vessels during the winter months of May, June, July, and Aug., when prevailing winds are off shore. S.E. winds are then unfrequent, moderate, and of but short duration. From Sept. to April strong breezes from the N.E. occasionally prevail, bringing into the Bay a heavy break of sea. These, however, seldom continue thirty hours. Vessels with good ground-tackle may ride with safety, or, if desirable, beat out at the usually gradual commencement of the breeze, and clear the Cape in one good board. Moderate S.W. winds, even at this season of the year, are very common.

Aliwal, the town, standing on the N. side of Cape St. Blaize, consists of about 130 houses, an episcopal chapel, and a Dutch church; other buildings are in course of erection. The trade and produce of the interior have been opened to this port by a road called the Meirings Poort, through a gorge of the Zwaartberg mountains, and a thriving commerce is the result. The population of the town consists of above 1,000. The civil establishment is composed of a resident magistrate, a collector of customs, a district surgeon, and a small police force. There is a harbour-master, and an accredited agent for Lloyd's. Several mercantile houses are established, three hotels, and many provision and retail stores. Postal communication is maintained with Cape Town in 36 hours, by the mail cart, three times a week. Excellent water is conducted to a new jetty for the use of ship-

ping. Ships' boats may land either at the jetty or on the beach, there being no surf. No port charges exist.

Directions.—Cape St. Blaise may be rounded closely, taking care to avoid Blinder Rock. On opening the Bay the town of Aliwal will be seen at nearly $\frac{1}{2}$ m. inside the Cape. The proper anchorage in Mossel Bay in summer is in from $4\frac{1}{2}$ to 5 fathoms, clay, with the village bearing S., or with Blands jetty head S. $\frac{1}{4}$ W., and the extremity of the Cape S.E. by S. From Sept. to April vessels should not anchor in less than 6 fathoms.

The heaviest gales are from W.N.W. Winter gales commence from N.N.W. with heavy gusts, unsteady both in direction and force, then veering to W.N.W. or W. They blow very hard in continuous gales, with barometer low (29.6 inches); finally, shifting rather suddenly to the S.W., they subside with steady breezes and occasional showers. At this latter period, a swell sometimes sets round the Bay, but not endangering vessels or interrupting the landing of stores with light boats.

Tides. It is H. W. at F. and C. at Mossel Bay at 8 h., and the rise of tide is 7 ft.

Knysna Harbour, entrance in lat. $34^{\circ} 6' S.$, lon. $23^{\circ} 4' E.$, has a depth of 18 ft. in it; only fit for small vessels. When the harbour is well open, bearing N., a village with two churches will be seen. There are two beacons for leading marks.—one on Fountain Point on the E. side, the other on the W. shore of Steenbok Island, within the harbour. A signal-staff is erected on Inner Obelisk Point, from which the following pilot signals are made with flags:—

White, blue.... The pilot boat is coming out.

Red Ship is recommended not to attempt to come in.

White, red Ship may come in now. If waiting for the tide, a red pendant will be shown over the flag at a proper time for entering.

Yellow Pilot boat cannot go out, but pilot is ready to receive ship within the bar.

Approaching Knysna Harbour from the W., steer for the S.E. rocks off the entrance; when the Harbour is well open, proceed towards Needles Point on the W. side of the mouth, until the two beacons come in line, which will lead up to Fountain Point. Pass close to this and steer for the rocky point between Green and Monkey Points, by which a depth not less than 3 fathoms should be maintained. When abreast of Green Point, haul in for a sandy patch close to the S. of Rocky Point, and anchor to the S. of it in Best Cove. It is H. W. at F. and C., at Knysna Harbour, at 3 h. 45 m.; the rise at springs is about 5 ft.

Plettenberg Bay, on the N. side of Seal Cape (lat. $34^{\circ} 6' S.$, lon. $23^{\circ} 25' E.$), has anchorage in 9 or 10 fathoms, good holding ground, with Seal Cape bearing S. by E., sheltered from all winds, except those between the S.E. and the S., which bring in a great swell. **Whale Sunken Rock** (having only 6 ft.), lies nearly 1 m. to S.E. of Seal Cape.

Cape St. Francis, in lat. $34^{\circ} 11' S.$, lon. $24^{\circ} 52' E.$, and 25 leagues S.E. by E. from Seal Cape, should not be approached in the night, being low and sandy; formerly it was mistaken for Cape Recife. Dense fogs prevail hereabouts. By night, vessels should not shoal under 40 fathoms.

ALGOA BAY. Cape Recife, the W. point of Algoa Bay, has a light-house. In making this Cape from the W., the hummock called Recife Hillock, being higher than the light-house, is often plainly seen before the latter. In approaching from the S., Cape St. Francis has been mistaken for Cape Recife; but they may be distinguished by the hummock, which shows from a great distance as the termination of the coast-line in that direction, and by a remarkable strip of bare white sand, showing as a beach, to the W. of the hummock. A Red stone beacon stands 500 yards N.N.E. of the light-house, as a mark for Dispatch Rock. Two stone beacons, near Beacon Point, stand E. and W., 1200 yards from each other; they are each 25 ft. high, with a ball, and painted in bands of Red and White.

Cape Recife Light. The light-house, in lat. $34^{\circ} 2' S.$, lon. $25^{\circ} 42' E.$, is a stone tower, with four horizontal White and Red bands. It exhibits a White light, revolving once in a minute, 93 ft. above sea, and visible from seaward about 15 m., between the bearings of E., and round by the N. to W. and S.W., and in Algoa Bay till it bears S.

Thunderbolt Reef lies about $\frac{1}{2}$ m. to S.S.W. of Cape Recife, and the sea generally breaks heavily upon its jagged rocks; but at high water and in fine weather this may not occur. There is an indraught towards this reef and the Cape, and no sailing vessel should attempt to approach either (except with a commanding breeze) within 2 or $2\frac{1}{2}$ m. Soundings about the Cape and Reef decrease very suddenly from 10 fathoms. Vessels should slacken speed to get accurate soundings in rounding the Cape, and not go into less than 15 fathoms, by night or day.

A strong indraught will often be felt after passing Cape Recife and Thunderbolt Reef, and allowance must be made for it in shaping the course, either inside or outside Dispatch Rock, parti-

cularly if going inside, as foul ground stretches a long way off shore, between the red beacon on the Cape and Beacon Point; and sailing vessels, by not allowing for indraught, have often got on shore.

Port Elizabeth. A heavy surf constantly breaks on the beach of Port Elizabeth, and surf or whale-boats are generally the only boats which can effect a landing; but a jetty, at the mouth of Beaken River, is available at all times for ships' boats, except during strong S.E. winds. Water and refreshments are easily procured at moderate prices, and leaky and dismasted ships are sometimes hove down, repaired, and refitted at their anchorage off the town. A breakwater, to shelter small vessels, is in course of construction.

Harbour-Light. Port Elizabeth Light-tower, of stone colour, with a time-ball on its top, is erected near Donkin Monument, on the hill over the town. It exhibits a *fixed* light visible seaward when bearing between N.W. and S.W. Each extremity of the arc; viz., from N.W. to N.W. by W., and from S.W. to S.W. by W. will be *Red*, and the intermediate six points *White*. The Light is 225 ft. above H. W., and visible in clear weather from a distance of 12 m. The *White* light kept in sight clears all dangers.

Anchorage. Inner anchorage off Port Elizabeth town, in about 6 or 7 fathoms, gray sand, may be taken with the S.E. angle of Fort Frederick bearing W. $\frac{1}{4}$ N., and the Bird Rock at Beacon Point S. $\frac{1}{4}$ E. Outer anchorage for large vessels in 8 fathoms, similar bottom, with the above objects bearing W. $\frac{1}{4}$ S. and S. by W. The port captain determines the berths for merchant vessels, and ships of war need only take precaution in the summer season, when E. or S.E. gales may be expected, to anchor with plenty of room to veer. The holding-ground is good, and ships of war have ridden out these gales. **At night**, anchor in 8 fathoms with the harbour-light bearing W. $\frac{1}{4}$ N.

Dispatch or Roman Rock (least water 8 ft.) should not be approached within 2 cables' lengths to the W. and N.W. From the shoalest part the Red beacon in line with Cape Recife Light-house bears S.S.W., and the two beacons on Beacon Point are in line. After rounding Cape Recife as above mentioned, the Red beacon will be first seen, and afterwards the two beacons on Beacon Point.

Riy Bank, E. by S., about 9 m. from Cape Recife, is about a mile in extent, and composed of foul ground, carrying from 6 to 10 and 14 fathoms of water. Therefore it is not exactly a danger impeding navigation, though it breaks with a long S. swell.

Winds and Weather. East and S.E. gales, which alone are to be apprehended in Algoa Bay, occur in the South African summer months; in the remainder of the year the wind seldom or never blows from these quarters, except in rare instances, when what is called *black S.*-Easter comes on, with rain and thick weather, of which the sky and sea give sufficient warning. The approach of summer gales is slightly foretold by the barometer, which falls before the increase of wind. A damp cold air also prevails, and a constant hazy appearance about the horizon, the upper parts of sky remaining clear. When signals to prepare for foul weather are made from the port office, where a barometer is kept, sailing vessels with doubtful ground-tackle should get under way, making their first tack towards St. Croix Island.

With the gale at its height a heavy breaking sea rolls in; but ships with plenty of cable have ridden easily; and the strong E. current, which prevails during these gales, probably assists to relieve the strain, with its powerful undertow.

Directions. Having brought the Light-house to bear N.W., if intending to pass outside Dispatch Rock, steer about N. by E., to keep the Red beacon open to W. of the Light-house, until the two beacons (Red and White bands) are in one, or Beacon Point bears W.N.W.; then steer for the anchorage off the town.

There is seldom any advantage gained in passing between Dispatch Rock and the main land, and it is strongly recommended that no vessel should attempt it.

At night, coming from the W., no vessel should shoal under 30 fathoms, and care should be taken not to get into St. Francis Bay, whence Cape Recife Light, bearing to the S. of E. is not visible. Until the Light bears N.N.W., a depth not less than 15 fathoms should be maintained, and the vessel should go slow. The current sets strongly towards the reefs; therefore if a vessel find herself dropping upon them, she must haul to the S. Whilst steering N.N.E., going E. of Dispatch Rock, a vessel must not go into less water than 10 fathoms, or come within sight of the Red ray of Cape Recife Light, until the Red strip of Port Elizabeth Light is passed, and its *White* light seen bearing N.W. by W., when a N.W. course may be steered to anchorage.

Caution. As Port Elizabeth Light being higher may be seen sometimes by vessels coming from the E., before the light on Cape Recife, care should be taken not to bring it to bear to the S. of W. until Cape Recife *revolving* light be distinguished.

Tides. H. W. on F. and C., at Port Elizabeth, occurs at 4 h., and the highest rise at springs is barely 5 ft.; the tides are often irregular.

St. Croix Island, 9 m. to N.E. of Port Elizabeth, is of nearly bare rock, steep to the N.E., but less so on the opposite side, where some stunted vegetation grows. There is fair anchorage at about 3 cables from St. Croix Island in 10 fathoms, sandy bottom, with its W. peak bearing S. by E. In this position the heavy tumbling sea caused by E. and S.E. gales is considerably broken, but the extent of sheltered anchorage is very confined.

The Coast from Sunday River eastward is formed by a chain of sand-hills, which extend inland 1 m. to $1\frac{1}{4}$ m. Many of these hills rise to the height of 350 to 450 ft. above the sea, and are quite bare. At Woody Cape, 22 m. from Sunday River, the sand-hills are covered with dark bushes; and from it sandstone cliffs, fronted by rugged rock, extend along shore for 2 m.; when sand-hills are again met with, which reach as far as Point Padrone.

Point Padrone, in lat. $33^{\circ} 47' S.$, lon. $26^{\circ} 28' E.$, is difficult of recognition from seaward. Rocks, over which at times the sea breaks with great fury, project to seaward nearly 1 m. About 2 m. to E. by S. there is a low sandy point, off which for 1 m., the swell was observed to break heavily. These are the only outlying dangers, the coast being approachable, even to the surf, in 7 or 8 fathoms; the depths decreasing regularly towards shore. Fresh water is found at Woody Cape and about Point Padrone, welling out from the base of sand-hills, just above H. W. mark. By digging into the sand, fresh water may be had nearly all along this portion of coast. Drift wood and fragments of wreck are found upon Woody Cape.

BIRD ISLANDS, a cluster of low rocky islets, E. $\frac{1}{4}$ S., 30 m. from Cape Recife, and nearly S.S.W. 5 m. from Woody Cape, were dangerous to navigation before the erection of a light-house on the largest of the group, which has the appearance of a ship under sail. These Islands are the resort of numerous sea-fowl, and are covered to the depth of several feet by an inferior kind of guano. It is 33 ft. above sea, 800 yards long, and 600 yards wide. No water is found on it, save in hollows of the rocks after rain. Eggs are abundant at seasons; a very palatable vegetable, not unlike spinach, grows on it. Fish may be had in plenty.

About $\frac{1}{4}$ m. to the N. of Bird Island, two other islets, called Stag and Seal, lying nearly E. and W., are connected at low water; but in fine weather a boat can pass between them at high water. Outside, or to the N.E. of these, a rocky bed, with $2\frac{1}{4}$ and 3 fathoms, extends nearly 1 m. from the light-house, and terminates in rocks above water, called the N. Patch. To the W. of Seal Island are five black, rocky islets.

Bird Island Light-house, in lat. $33^{\circ} 50' S.$, lon. $26^{\circ} 17' E.$, is a white wooden pyramid, with a broad black belt in the middle. It stands on the S. side of the Island. It exhibits two *fixed* white lights, 61 and 51 ft. above H. W., visible 10 m. They are 18 ft. apart horizontally, and, when directly over each other, point to the Doddington Rock, upon a S.W. $\frac{1}{4}$ W. bearing. The upper lantern has a shade on the N. or in-shore side, which renders the light invisible from the anchorage to N.E. of these Islands, when bearing between S. by W. and W. by S.

The Doddington and E. and W. Rocks are three dangers lying within $1\frac{1}{4}$ m. of the Bird Island Light, with it bearing between N.N.E. and E. The two former are awash, and the latter has $2\frac{1}{4}$ fathoms over it; but the sea is seldom so smooth as not to break. Close around, the depths are 10 to 12 fathoms. Between these Rocks and the island the soundings are irregular, between 5 and 10 fathoms. During heavy weather, a tremendous sea rolls over the whole of this space, producing a surf truly terrific, the sea breaking in 8 and 10 fathoms water to seaward. It is necessary to give the Bird Island dangers a wide berth in passing, since it is difficult to distinguish between the sea that breaks in 10 fathoms, and that which rolls over the reefs. This is one of the most dangerous parts of the coast, especially to a stranger.

The Anchorage is on the N. side, but the holding-ground is not good, and the bottom uneven. Best anchorage is with light-house in line with N. patch, in 8 to 10 fathoms water. Vessels that load here with guano usually anchor with the black rocky islets about in line with Stag Islet, in 8 to 10 fathoms, as it is more convenient for boats to come off with cargo. It frequently happens that there is no landing, the rollers setting in during calm weather, as well as in a gale. After these have subsided, care is necessary in landing, as the sea sometimes breaks heavily and unexpectedly between the islands.

Tides and Currents. Near the Bird Islands no regular tidal stream was found, but a regular rise occurs. It is H. W. on F. and C., at 3 h. 15 m., with a rise of 6 ft. in Dec. At the anchorage the current sets in general to the E., and at one time, during a strong W. gale, it ran E. at the rate of $1\frac{1}{4}$ knots an hour. It was, however, in two other W. gales, found setting to windward.

Kowie River, or Port Alfred, in lat. $33^{\circ} 34' S.$, lon. $26^{\circ} 50' E.$, admits small vessels drawing

8 ft., but rollers are frequently heavy. Cook Rocks stand $2\frac{1}{2}$ m. to S E. of the river mouth. The course inwards is about N.N.W.

Great Fish Point is a projecting part of the coast, in lat. $33^{\circ} 31' S.$, lon. $27^{\circ} 7' E.$

EAST LONDON. BUFFALO RIVER. The flag-staff at the entrance is in lat. $33^{\circ} 1' S.$, lon. $27^{\circ} 55' E.$ Ships proceeding to Buffalo River from the W. will find the coast from Great Fish River Point to Cove Rock even and sandy. The Keiskamma and several other rivers run into the sea on this part of the coast; are all bar rivers, over which a heavy surf is at all times breaking; and all so much alike, that it is difficult for a stranger to tell one from the other. A mark for making the Buffalo is Cove Rock, 6 m. to the W. of Hood Point, and when seen by a ship running close along the shore to the E., it appears like an island, quite black, and without vegetation, and joined to the main land by a low sandy neck, over which the sea breaks heavily after S. gales. When abreast of Cove Rock, the houses of East London and two flag staffs may be observed over Hood Point. Variation $29^{\circ} W.$

Light. A light-house stands on the reef at the S. side of the river; its base is square, in alternate Red and White bands. It bears E.S.E. nearly 400 yards from the flag-staff on the hill. It has a fixed White light, 45 ft. above H. W.; visible in clear weather about 11 m.; lat. $33^{\circ} 1' S.$, lon. $27^{\circ} 55' E.$

Directions. Hood Point is low, and ships should give it a berth of at least $\frac{1}{2}$ m., for a reef extends from it, and a dangerous patch lies about $\frac{1}{2}$ m. off. The best anchorage was found to be in $9\frac{1}{2}$ fathoms, with Cove Rock just shut in by Hood Point, bearing W. by S., and the river open; light-house N.W. $\frac{1}{2}$ W.; Reef Point N.E. by E. At the anchorage off Buffalo River, vessels generally lie broadside to the swell, rolling and straining much.

To land troops vessels should lie with a good scope of cable out. The port office has the Commercial Code of signals, by which communication can be made. Should the weather be fine, and the bar passable, surf boats will probably be at the outer buoy, from which to the ship a hawser should be run, as current at times sets too strong for boats to tow against. A Red flag, with a White square in its centre, is hoisted at the lower flag-staff when the bar is passable; at half-mast when it is dangerous; but hauled down altogether when impassable. However smooth it may appear, the bar should never be attempted by ships' boats.

Vessels from Algoa Bay to Buffalo River should leave at such a time that the latter half of the passage can be performed by daylight; but should the weather be fine, and Cove Rock not visible before dark, it would be better for a steamer to anchor off the coast in about 12 fathoms (with her steam up or nearly so), in preference to lying-to for the night, as the current sometimes sets 80 m. to windward against a strong S.W. gale in 24 hours. Sailing-vessels bound for the Buffalo would do well to secure a latitude half-way between Cape Morgan and Buffalo, bearing in mind that the current always sets to the S.W.

A strong current was always experienced setting along shore to the W. from 2 to 4 knots per hour. This current probably strikes against Great Fish River Point, which sets it off from the coast in a S. direction. The stream running out of the river after heavy rains, meeting the coast current at right angles, produces a very variable current at the anchorage. It is the opinion of coasting captains that the W. current runs 5 knots an hour in strong W. gales, and from 2 to 3 knots in moderate weather. An E. current is seldom known but in very fine weather.

Tides. It is H. W. at the Buffalo River entrance, F. and C., at 3 h. 45 m.; springs rise $4\frac{1}{2}$ ft.

River Kei is in lat. $32^{\circ} 41' S.$, lon. $28^{\circ} 26' E.$, and 2 m. N.E. from Cape Morgan, which is a low point; but the land at the back of it rises into a somewhat remarkable hill, covered with grass and bushes intermixed. From the N. extreme of the sand spit, which partly forms the river's mouth, breakers extend seaward, to S.E., nearly a mile. On the bar the least depth found was 7 ft. at low water.

A remarkable sand patch, on the face of the dark hill on N. shore of the river, serves as a guide to the entrance; during heavy rollers the channel is impracticable. During flood tide the stream sets to the N. close in shore, and to the S. during the ebb.

Snag Rocks are three low, rocky islets, the S. and largest of which, called the Snag, is 20 to 25 ft. above the sea. All around these islets, which lie about $\frac{1}{2}$ m. S. by W. from the river mouth, the sea breaks heavily; but this does not shelter the main beach, which is all rocky.

At nearly 1 m. off shore, near Kei River, the current was found invariably to set to the S.W., at the mean rate of $1\frac{1}{2}$ knots an hour. At first quarter ebb, the stream from the River reached as far to S.E. as the anchorage, where it joined the coast current, and both ran to the S.W. together. During flood tide the influence of the stream was not sufficient to alter the general direction of the ship's head.

The Coast from Cape Morgan to Sandy Point, 15 m. N.E., affords no landing through the

heavy surf. At Bashee Point, in about lat. $32^{\circ} 16'$, a ledge of rocks, having a heavy surf upon them, extends off about $\frac{1}{2}$ m. **Rame Head**, in about lat. $31^{\circ} 48'$ S., lon. $29^{\circ} 14'$ E., is a bold rocky point, sloping gradually, with a small rock at its extremity. To the W. of the Head, about $\frac{3}{4}$ m. off shore, is a shoal with from 8 to 10 fathoms on it. **Brazen Head**, about 5 m. to the N.E. of Rame Head, has from the E. the appearance of two distinct points densely wooded and very steep.

RIVER ST. JOHN, or UMZIMVUBU, has its entrance in lat. $31^{\circ} 35'$ S., lon. $29^{\circ} 29'$ E. A lofty table-topped mountain 1200 ft. in height, appears to have been cleft to its base, leaving a wedge-shaped gap in the centre, through which the river flows to the sea into Gordon Bay. Cape Hermes, the S. horn of this Bay, has a round grass-covered hill, 420 ft. above sea, and the N. horn has a similar hill, but not so large nor so high. The depth of the Bay is scarcely $\frac{1}{2}$ m. From Cape Hermes the coast to the distance of 800 yards N. by W. is all rocky; it here joins a sandy beach, which runs to N. for $\frac{3}{4}$ m. to the spit at the river entrance. At the junction of this rocky and sandy coast there is a small nook, called Paul's Cove, where the boats of H.M.S. *Hermes* effected a landing, when the river bar seemed impracticable, from the heavy surf.

The bar of this River, being subject to change of position, small vessels which enter the River with merchandise are guided over it by a *shifting* mark upon the shore, at the back of a hut, which is built near the end of the spit, at the W. point of river entrance. There is a trading station about 9 m. from the mouth of the River, to which place the vessel employed as a trader carries her inward cargo. A surf boat and surf warps are employed in communicating with this vessel when outside the bar.

The **Rainy Season** prevails from Oct. to April, when great changes are produced in the channel already mentioned. The natives are of mild disposition, and upon friendly terms with European traders. During all but very boisterous weather, the River is practicable for surf-boats provided with necessary warps and buoys.

Anchorage can be taken in 12 or 13 fathoms, with Cape Hermes W.N.W., about $\frac{3}{4}$ m. off; and Porpoise Rock N. by W. $\frac{1}{2}$ W., rather over 1 m. off; but the bay is exposed to winds from E., round by the S. to W. During the flood-tide, which runs regularly, a strong current was found setting to S.S.W. along the sandy shore inside the breakers, and to seaward along the rocky shore in the direction of Cape Hermes. This current should not be forgotten in attempting to land with a flood-tide. Upon one occasion, it was found so strong that a cutter could barely stem it. Should a boat be swamped in the surf, it would be almost impossible for the crew to reach shore; and sharks are numerous and ravenous, both outside the surf and inside the river mouth.

Tides. It is H. W. on F. and C. at River St. John, at about 4 h.: the rise is 5 ft.

This Coast, from Rame Head to Waterfall Bluff, is faced with several high bluffs. The Waterfall, in lat. $31^{\circ} 25'$ S., is 200 ft. high; from it, about 6 and 12 leagues to E.N.E., there are two sand-bluffs; but beyond them, the Coast has no remarkable features, except False Bluff, which is 10 m. to the W.S.W. of Cape Natal.

Aliwal Shoal is dangerous, about a mile in length, in lat. $30^{\circ} 15'$ S., lon. $30^{\circ} 50'$ E., and lies in the track of vessels bound for Natal from the S.W. upwards of 2 m. off and parallel to the shore. It has from 2 to 6 fathoms on it, and 15 fathoms close to all round, at L. W. From its shoalest part Cape Natal bluff bears N.E. by E., 25 m. off (of course not visible), and Green Point bears N.W. $2\frac{1}{2}$ m. off. The water is deep inside the shoal; 15 to 12 fathoms being obtained close in shore.

Impulse Shoal, in lat. $30^{\circ} 19'$ S., lon. $31^{\circ} 12'$ E., was reported in 1860; but the position of the danger is given as *doubtful*.

Cape Natal is a high, wooded tongue of land, terminating in a remarkable bluff, which is easily made out, the coast to the N. being low for several miles. There are no outlying dangers in approaching it, and the water is deep close to land. The coast to S. of Cape Natal is of moderate elevation near the sea, and broken in several places by mouths of rivers and streams. The hills rise inland to a considerable height. Variation of compass 27° W.

PORT NATAL. A vessel intending to enter the Port, and in want of a pilot, should anchor in the road in 9 or $9\frac{1}{2}$ fathoms, sandy bottom, when the flag-staff on bluff bears S.W. 1 m. A signal being made, Pilot will be sent off; or, if surf on the bar is too heavy, the fact will be signalled from the flag-staff. Anchorage in the road is safe so long as the wind does not blow directly on shore, which is seldom the case; but H.M.S. *Southampton* drove and was very nearly wrecked here during a gale from E.S.E.; when the wind is inclined to freshen from that quarter, with a long swell and high barometer, a ship should go to sea as soon as possible.

The **Bar** should on no account be attempted by a stranger, as the channel must shift till all harbour-works are complete. The stone pier, or groyne, on the N.W. side from D'Urban sandy point, is 2000 ft. long. A short wall with a *fixed* harbour-light, was proposed, from the base of

Natal Bluff, forming the S.E. side of the harbour, the entrance to which is nearly 200 yards wide, with 3 or 3½ fathoms at H. W., according to the season. W. winds and rains deepen the Bar between October and February, but in dry months (March to Sept.) sand accumulates.

Light. Natal Bluff has a light, *Revolving* every minute, elevated 280 ft., visible 24 m. in clear weather. Not visible from Aliwal Shoal, but to the N. of that danger, the light is seen from seaward bearing about N.E. by E., round by the N. and the W., till in Natal Bay it bears S. This Cape Natal *revolving* light is in lat. 29° 53' S., lon. 31° 3' E.

D'Urban Town stands 2 m. to N.W. of the light-house, and is a thriving place. Fresh water is sent off in large boats to vessels lying in the road outside the Bar. Refreshments of all kinds may be obtained at moderate prices in harbour. The chief exports are wool and ivory. The sugar-cane flourishes, and excellent sugar has been produced; also arrowroot and rice, ginger, turmeric, chicory, coffee and tobacco; of fruits, pine-apples, mangoes, bananas, sour-sops, lemons, chilies, &c., also thrive; as well as potatoes, European vegetables, and corn and oats. A life-boat and a steam-tug are kept at this port.

Tides. In the port of Natal, abreast the custom-house, the time of H. W. on F. and C. is 4 h. 30 m., and the rise of spring tides is 6 ft. The ebb at springs on the Bar runs about 3 knots per hour, and between Sandy Point and the Bar about 2 knots. In the road, outside the Bar, the stream of flood sets to the S.W., and of ebb to the N.E. It is necessary to caution the seaman against the strong current which prevails on Natal coast, from 3 to 30 m. off land. It is uncertain both in direction and force, but generally sets to the S.W. at the rate of 2 knots an hour.

Coming from the N., Port Natal Bluff is most conspicuous; and the coast of Natal is generally of moderate height, interspersed with sand hills; in many places the shore is rocky, with deep soundings near it. Between Port Natal and Cape St. Lucia, soundings extend 3 or 4 leagues off, and 6 leagues off from Fisher River, which is in lat. 29° 16' S., lon. 31° 33' E., distant from Port Natal 15 leagues to the N.E., and Durnford Point is 8 leagues further.

Cape St. Lucia is in lat. 28° 32' S., lon. 32° 28' E., and 7 m. farther N. lies River St. Lucia, with a sugar-loaf hill on its S. entrance. The land of St. Lucia Point has a series of bluff capes. From hence the coast runs 8 leagues to Cape Vidal, in lat. 28° 9½' S., lon. 32° 38' E.; thence nearly straight N.E. by N. for 44 leagues to the Island St. Mary, or Cape Inyack, at the entrance of Delagoa Bay. This extent of coast from Cape St. Lucia was called Fumos by the Portuguese. It is generally composed of rather low land near the sea, and little frequented by Europeans. Several parts of this coast have no soundings except near the shore. Variation 25° W.

DELAGOA BAY, or Lorenzo Marques, is 5 leagues in breadth E. and W., and from N. to S. 14 leagues; but all the S. part is shallow and unsafe. Cape Colatto, in lat. 26° 4' S., lon. 33° 1' E., the S. boundary of the Bay, has a round-top hill not far within the point. Port Melville is to the W. of Elephant Island. Lorenzo Marques Fort, with a Portuguese garrison, stands in a swamp on the N. shore of English River, about 1½ m. within Reuben Point. Shefeen Island is to E. by N. of that point, and to N.W. of Elephant Island.

Inyack, or St. Mary Island, is high, undulating land, near middle of which, on the E. side, there is a single hill with white spots; and the Island is separated from Cape Colatto peninsula by a narrow, rocky channel. The N.E. extremity of St. Mary Island, Point Inyack, is in lat. 25° 58' S., lon. 33° 2' E. A little to the N. of St. Mary there is another small one, called Elephant Island, from which detached shoals called Cockburn, Hope, Domett, and Cutfield, extend about 18 m. to the N. Between these shoals, there are narrow channels, with various depths of 5 to 7 fathoms. The bank of soundings extends but a small distance to seaward; and after getting bottom, the water shoals fast in running into the Bay; the bottom is rocky, with very irregular soundings, requiring care in a large ship. A ship bound into this Bay should keep boats ahead sounding, as the sands are said to shift with the tides, which are irregular. Outside the entrance, the general depths are from 5 to 7 fathoms, with 12 to 16 fathoms at 2 leagues off.

Pantaloon Shoal, in lat. 25° 46' S., lon. 33° 5' E., has 5 and 6 fathoms about 20 m. off shore. Great caution is requisite in this vicinity till more minutely examined.

Directions. An extensive reef runs out from Cape Inyack, and the Cockburn Shoals extend for 6 leagues to the N. of the Cape, with from 4 to 2 fathoms on them, and 5 to 7 fathoms in channels between them. It is not safe to pass through these channels, which are very narrow, with no other guide than soundings. It is better to stand at least 18 m. to the N. of Cape Inyack, which will clear the Cockburn, Hope, Domett, and Cutfield Shoals; then stand to the W. and the S.W., about 2 m. off shore for some 5 or 6 m.; hauling out to the S. to pass the E. of Shefeen Reef. To clear which, bring Mount Colatto over the L. W. part of Inyack Island, and just open of the W. point of Elephant Island, and with these marks run to the S. until Point Reuben (remarkable for some red cliffs immediately to the N.) bears W. by N.; this will lead clear of Shefeen Reef, which

projects 4 or 5 m. to the E. of that island, and between which and Hope Shoals the channel is 4 m. wide. Then steer for Point Reuben, and anchor in 6 fathoms, about 6 m. off it, bearing W. by N. $\frac{1}{2}$ N., and the extremes of Shefeen Island between N. and N.N.E. Wait here till tide suits for entering English River. Point Reuben the N. point of the entrance, must be approached nearest in entering this river, where the depths are 3 and 4 fathoms at L. W. between the points, increasing to 7 and 8 fathoms about 2 m. inside. Ships may anchor 1 or 2 m. within the entrance, or 3 or 4 m. farther up, where the depths are 8, 9, and 10 fathoms. There is a good watering-place on the S. shore, opposite to the anchorage; and a little above Point Talloqueen, a long sandy point on the same side, there is a small rivulet, where the Portuguese have a resident; opposite this, on the N. side of river, the ruins of the Portuguese fort are visible.

Sailing into or out of Delagoa Bay, the shoals will generally be seen in clear weather from the mast-head; but it is advisable to keep a boat ahead sounding, as the sets of tide are not regular, and there are often strong rippings. The depths above mentioned are at low-water spring-tides. The bar of the river has $2\frac{1}{4}$ fathoms at L. W.; ships ought, therefore, to cross it with the flowing tide.

English River extends a great way into the country, and is the only one navigable for ships of moderate size; for, although several other rivers fall into this bay, the shallow water on their bars prevents vessels of burden from entering. The largest of them is Manice (King George) River, on the N. side of the Island Shefeen. Mapoota River, at the S. part of the bay, has very shoal water. The Factory Flag-staff at English River is in lat. $25^{\circ} 58' S.$, lon. $32^{\circ} 37' E.$ A considerable trade was formerly carried on at these rivers for elephants' teeth; but few English ships, except whalers, now visit this bay. Although Portuguese still retain a little intercourse with the natives, ships which trade here ought not to place much confidence in them, particularly if boats are sent a great distance up the rivers with goods to barter; for in such cases the natives have been known to attack them, and massacre the crews. Elephants' teeth are procured in barter for India goods and coarse stuffs of various kinds. The bay abounds with fish, and inland the country is fertile, producing grain; bullocks, sheep, poultry, and other supplies may be procured, and also fruits, among which pine-apples and water-melons are the chief. Sugar-canes are also cultivated by the natives. This bay is much frequented by southern whalers, who kill here the black whale; but it is a very unhealthy place, being subject to jungle fevers, which proved fatal to many officers and men employed on the survey in H.M. ships *Leven* and *Barracouta*, under the late Admiral Owen; and some of the whalers have been disabled by the loss of nearly all their people. During the unhealthy season, from Sept. until the end of April, ships visiting this place will be liable to the pestilential scourge, if the people are employed on shore, or sent up any rivers, to trade in boats with the natives; and above all, during night, in the proximity of low mangrove swamps, near the banks of rivers. The country inland is mountainous, but low where it fronts the sea, adjacent to the rivers. On the coast to the N.E. of Delagoa Bay is Lagoa River, the entrance of which is in lat. $25^{\circ} 20' S.$, lon. $33^{\circ} 13' E.$

Tides. H. W. at 5 h. 15 m., on F. and C. of moon, and rise of tide 12 ft. at the Portuguese Factory. At Shefeen Island about a half-hour sooner.

CAPE CORRIENTES (small rock), in lat. $24^{\circ} 7' S.$, lon. $35^{\circ} 30' E.$, bears E. by N. from Delagoa Bay, about 60 leagues. The coast, from River Lagoa to Zavora Point, runs nearly straight E., by compass, for 40 leagues, and has several rivers, the largest of which is Inhampura, in lat. $25^{\circ} 11' S.$, lon. $33^{\circ} 34' E.$, about 20 leagues from Cape Colatto; and Gold River, 16 leagues farther E. Inhampura Shoals extend from lat. $25^{\circ} 12'$ to $25^{\circ} 10' S.$, and from lon. $33^{\circ} 39'$ to lon. $33^{\circ} 46' E.$ Cape Corrientes has a hill over it, which may be seen 10 or 12 leagues; the coast about it is clear of danger, with deep water, the edge of the bank of soundings not extending above 3 or 4 m. off shore. The current generally sets round it to the S.W., and afterwards along the coast of Natal.

Cape Wilberforce, bears N.E. 5 leagues from Cape Corrientes; the coast then runs to N. about 8 m. to Barrow Hill Point, the S. extreme of Inhambane Bay; it consists of barren sand-hills, moderately high, visible 20 m.; at a distance appearing like chalky cliffs.

Inhambane Bay has not been yet minutely examined, but a few depths from 7 to 23 fathoms are given in it. The S.E. point is sandy, with a sand-hill over it, called Barrow Hill, in lat. $23^{\circ} 45' S.$, lon. $35^{\circ} 33' E.$ From this point the coast turns sharp round to the W., to the low point of Inhambane River, off which a reef of heavy breakers extends to N., about 7 m. This reef forms the W. side of the Bay, the anchorage being about 3 m. to the N. of Barrow Hill, in 7 or 8 fathoms. Between the low points which form the entrance of the river, the distance is about 5 m., but it is almost barred up with low sandy islands and banks; the channel is near the N.W. shore, round the N. point of the reef before mentioned, having variable depths from 2 to 12 fathoms; but it is narrow, and not frequented, except by small vessels. The bar should not be attempted without a pilot; if signalled for, a Portuguese will come off. There is a heavy sea on the bar during S. winds. Inhambane Town, in lat. $23^{\circ} 52' S.$, lon. $35^{\circ} 25' E.$, is on the E. shore, about 15 m. up

the river, where some trade is carried on by Portuguese in slaves, &c., having here a resident. There is a small fort and a few troops for protection. Ivory may be procured here; other products are coffee, cotton, indigo and sugar; oranges and lemons in great abundance.

The Coast. Between the sandy point and Cape Corrientes, the current sets strong to the S. great part of the year which will oblige a ship to anchor near the shore, if the wind fail in steering to the N. The coast from Inhambane River extends about 50 m. N.N.E. to Cape Lady Gray, a headland, in lat. $22^{\circ} 56' S.$, lon. $35^{\circ} 41' E.$ Above that Cape it recedes to W. about 1 league, then trends N. for 50 m. about 150 ft. high, covered with dark bush, to Cape St. Sebastian; between them there are several rivers of small size, not navigable; the first, called French River, about 12 or 13 leagues to the N. of Inhambane, and another farther N., called Robbers' River. This part of the coast has in general a sterile appearance, with sand points at the entrance of rivers, and is high in some places, particularly to the N. of the latter river.

Zambia Shoal, with 3 fathoms, lies $3\frac{1}{2}$ or 4 m. off shore, bearing about N. by E. 10 m. from Cape Lady Gray. Abreast of this Shoal, the cliffs are of reddish colour.

Cape St. Sebastian is in lat. $22^{\circ} 6' S.$, lon. $35^{\circ} 32' E.$; the land over it being high, may be seen at 10 leagues. In approaching, it appears highest to the S., and there are no soundings at a greater distance than 2 or 3 m. from shore. From this Cape the land trends to the W., forming a bay, barred up with shoals between the Cape and Bazarouta Islands, and the whole of the Sofala coast from hence to Luabo River, the S. branch of the Cuama, is low and woody, with a sandy beach in most places.

Bazarouta Islands extend in a chain to the N. of Cape San Sebastian, and appear like one island in coming from the S. Cape Bazarouta, their N. extremity, is in lat. $21^{\circ} 31' S.$, lon. $35^{\circ} 31' E.$ A reef projects from it, covered at H. W.; a large cove is formed on the W. side of the N. island, called Bazarouta, or Punga Bay, where a ship might find shelter from E., S., and W. winds, and procure wood and water: it has from 7 to 15 fathoms water, but is lined by shoal banks on each side. **Marsha** (St. Carolina Island) in the Middle of this Bay, is the principal establishment of the Portuguese between Inhambane and Sofala, having a commandant and a military detachment. The entrance is from the N., a little nearer to the Great Bazarouta, or N. island, than to the main land opposite. There is no passage between these islands for ships. Great Bazarouta is about 15 m. long, N. and S., an undulating range of sand-hills from 100 to 200 ft. high. It is said to be steep-to, but the chart shows a rock more than $\frac{1}{2}$ m. E. of the Cape. In hauling in for land N. of Bazarouta Islands, soundings decrease regularly on the bank, to 8 fathoms sand, about 3 leagues from shore; but ships running in to the S. of Sofala must be careful of several dangerous shoals, covered at half-tide, stretching far out from the coast, and lying directly in the way of ships coming from the S., bound into Sofala. One of these, **Inverarity Shoal**, is in lat. $20^{\circ} 42' S.$, lon. $35^{\circ} 10' E.$, and nearly $3\frac{1}{2}$ leagues from the land.

Moromone Bay, 30 m. to N. of Marsha, is the embouchure of the Govooro, which is a fine river with a bad entrance.

Cape Sabia, or **St. Maria**, bearing N.N.W. 40 m. from Cape Bazarouta, is the most prominent point of the Savey, or Sabia River Delta, which extends from Moromone Bay to Chulawan. All this coast is low, with creeks, and fronted with mangrove bushes. Soundings shoal quickly from 10 to 3 fathoms.

Chulawan, or **Holy Island**, low and sandy, but thickly wooded, appears joined to the main land, and its N. point is in lat. $20^{\circ} 38' S.$ lon. $34^{\circ} 53' E.$; 5 or 6 m. in length, low, and covered with trees. Shoals projecting from the points of the island, and others detached, seem to render any navigable passage into the Sabia River impossible, except for boats.

Caution. Ships touching on little frequented parts of the E. coast of Africa ought to be careful in landing with their boats, for the natives have reason to be prejudiced against Europeans; French and English vessels, after enticing natives on board, have carried them away, and sold them as slaves. At Sofala, and other places where Portuguese reside, a guard is placed on board of any vessel that may touch there, to prevent illicit trade: but, by gaining favour of the commandant, trade may be carried on at most of these places. They are all under Mozambique Government, and all coasting vessels belong to that port.

SOFALA RIVER, 30 leagues to N. by W. of Cape Bazarouta, has a fort on N. side of its entrance, in lat. $20^{\circ} 11' S.$, and lon. $34^{\circ} 46' E.$ The land here is all low, but a few tall trees indicate the town and river; the latter cannot be entered by vessels of great burthen with safety, there being only 12 ft. water on the Bar at low tide, and the entrance is intricate. Large ships should not approach Sofala nearer than 3 leagues. Shoal patches of $2\frac{1}{2}$ fathoms lie 2 leagues off shore. **Anchorage** for strangers is in 6 or 7 fathoms at L. W., with the fort N.N.W., about 8 m. off. A pilot is obtainable, but terms not known.

Tides. H. W. at 4 h., on F. and C., at the anchorage. Rise of tide on the springs, 19 to 22 ft. **Sofala Town** is by the Fort, and has about 2000 inhabitants, with a Portuguese governor and small garrison. This is said to be the Ophir of Solomon. The trade is now insignificant; but by old Portuguese accounts, the vicinity produces gold, silver, copper and iron; pearls are found on the banks. Sugar-cane, rice, cotton and tobacco are cultivated. In moderate weather, at H. W. spring-tides, large ships might enter the river if the channels were buoyed. The channel, deficient of proper landmarks to guide a stranger, is between Sofala Spit and Matto Grosso Sand, off which the sea breaks at a quarter ebb. Bullocks and poultry may be purchased from natives on *moderate* terms, but not so if procured from the Europeans.

The coast above Sofala trends still N. about 15 m. into Masangzani Bay, into which Booy River falls. There are many outlying shoals, and the land is low. Soundings of 5 fathoms extend nearly 3 leagues from land. Masangzani Point, the E. extreme of that Bay, is about 20 m. N.E. by N. of Sofala Fort.

Sofala Bank of Soundings extends more than 60 m. from the coast in the latitude of Sofala. Near river mouths the bottom is muddy, but in deeper water it is sandy. The verge of soundings extends nearly straight N.E. from Cape Bazaruto to Quillimane River. A safe rule is not to shoal under 15 fathoms by night along this low coast.

The coast, above Masangzani Bay, trends to E.N.E. about 80 m. to the W. mouth of the Zambesi Delta. Sand-hills fringe the shore, which are highest, about 200 ft., in lat. $19^{\circ} 38' S.$ About 34 leagues E.N.E. of Sofala, in lat. $18^{\circ} 57' S.$, lon. $35^{\circ} 56' E.$, is the W. side of Luabo River, the S. mouth of Zambesi, or Great Cuama River; here spring-tides rise 22 ft. In this extent of coast the land is low, with sandy plains; and several small rivers fall into the sea. This coast is safe to approach into 8 or 9 fathoms, the soundings being regular toward the shore. The W. shore of the Luabo is very low, but trees cover the E. side. From Luabo River, the coast extends about 7 leagues E. by S., then turns again to E.N.E., which space comprehends the several entrances of the Zambesi River.

THE ZAMBESI DELTA, comprises five mouths along 80 m. of coast; the W. Luabo; the Melambe; the Kongoni; the Zambesi, or E. Luabo; and the Muselo. From this last, the coast bends round to the N. for 20 m.

Shoals. Changes at times occur in sand-banks off the Zambesi. Luabo Shoals extend some distance to the E. The Elephant Shoals, in lat. $18^{\circ} 56' S.$, 3 or 4 m. off shore, are the outermost of these dangers. A bank was reported by H.M.S. *Lily* in 1843, in lat. $18^{\circ} 35' S.$, lon. $36^{\circ} 40' E.$, with 3 and 6 fathoms; land just in sight from mast-head, and supposed about 14 m. distant. This was 20 m. E.N.E. of the Muselo mouth.

Kongoni Mouth is considered the best entrance of the Zambesi, and by it the expedition under Livingstone entered in 1861. Pearl Island, the E. side of the Kongoni, is in lat. $18^{\circ} 53' S.$, lon. $36^{\circ} 11' E.$ The Portuguese have a flag-staff on the W. side of entrance, and a beacon on Pearl Island. The Bar may be crossed with Beacon N. by E. $\frac{1}{2}$ E.; and ships should anchor further out, on same bearing, in 6 or 7 fathoms, more than 4 m. off shore.

Current generally sets to W., causing ships at anchor off the Zambesi to lie with broadside to the usual S.S.E. wind, and consequently to roll much.

Tides. It is H. W. on F. and C. at $4\frac{1}{2}$ h. Springs rise 12 to 15 ft., sometimes more. The ebb runs at springs 4 knots an hour off the Bar. At L. W. the river is generally fresh. In the rainy season—Oct. to Feb.—the river banks are sometimes submerged 2 ft. at high tide.

Muselo Mouth, with sand-banks off it, forms the most prominent point of the Zambesi Delta; but the surf is always heavy, preventing any attempt to effect an entrance; nor is the channel known. To N. of Muselo, there are three or four other mouths,—the Namera, the Lindi, and Indian Rivers,—which doubtless are outlets of the Zambesi; but ships should not shoal under 9 fathoms in this bight.

QUILLIMANE RIVER, the N. branch of Zambesi, is 1 m. in width between Hippopotamus Point, on the W. side, and Point Tangalane on the E. This River is said to be 180 leagues in length; about 6 leagues up, on the N. shore, the first Portuguese factory was constructed. Senna, the principal settlement, in lat. $17^{\circ} 30' S.$, lon. $35^{\circ} 44' E.$, is, by the undulations of the river, more than 60 leagues up. The flag-staff on Point Tangalane is in lat. $18^{\circ} 1' S.$, lon. $37^{\circ} 1' E.$; but the entrance is not easily known, land on each side being low, with cocconut-trees; on the S. point there is a small sand-hill. There is generally a considerable swell on the Bar, which has $1\frac{1}{2}$ fathoms on it at L. W., and the tide rises 16 ft. on the springs: H. W. at 4 h. 15 m. Inside the River the depths are 4 to 10 fathoms between the points; from thence to the town, are various shoal banks, and the Island Pequena about 4 m. inside the mouth. About 3 or 4 leagues up, fresh water may be had from a stream on the N. shore.

The Bar. A shoal bank projects to S.E. from each point of the entrance, contracting the Bar, which is about 3 m. outside the River's mouth, with 9 ft. on it. Being bound in, steer for Point Tangelane, on which the flag-staff, or a few cocoanut-trees, may be perceived, bearing about N.N.W., and the River's mouth will be seen open to the left. The current usually sets to the W. past the River mouth. Breakers run very high in bad weather on the tails of the sands, and it is proper to keep in mid-channel. The Bar is subject to changes, and caution is needed, as many accidents have happened to boats of H. M.'s ships on that station, and many lives have been lost.

Quillimane Town is about 5 leagues from the Bar, on the N. bank of the river, in lat. $17^{\circ} 52' S.$, lon. $37^{\circ} 1' E.$ Variation $18^{\circ} W.$ When S. winds prevail, it is prudent to anchor in the road to the S. of Hippopotamus Point, in 4 or 5 fathoms at L. W., about 3 m. off shore, which point may be known by sandy spots to the S. In the opposite monsoon, the anchorage should be to the N. of the entrance, as the winds frequently blow strong in both monsoons, and the current runs along shore with the wind. From this river the Portuguese formerly exported slaves, elephants' teeth, and some gold. Provisions are scarce.

River Quizungo is about 42 leagues E. by N. from Quillimane River, in lat. $17^{\circ} 2' S.$, where trade is carried on by boats from Mozambique: between these there are other rivers of smaller size.

The Coast between Quillimane and Quizungo Rivers, is generally low, sandy, with jungle at the back. Capes Fitzwilliam and Edward, the first a yellow bluff, the latter a red bluff, are the most remarkable points; they are 6 m. apart, and Cape Edward is 33 m. W. of the Quizungo. Soundings gradually decrease towards the shore, but several shoals have been discovered in the line between Quillimane and the outer Primeira Islands. These shoals bear the names of the vessels which discovered them; the *Brisk*, in lat. $17^{\circ} 55' S.$, and lon. $37^{\circ} 17' E.$ (7 fathoms); the *Pantaloön*, in lat. $17^{\circ} 44' S.$, and lon. $38^{\circ} 1' E.$ ($3\frac{1}{2}$ fathoms); the *Acorn*, in lat. $17^{\circ} 37' S.$, and lon. $38^{\circ} 18' E.$ ($2\frac{1}{2}$ fathoms). Deep water surrounds these shoals, and probably others exist.

David Shoals (5 fathoms), have their centre in lat. $17^{\circ} 30' S.$, lon. $38^{\circ} 36' E.$, and outside of these, about 12 leagues to the S.W. of Fogo Island, there is a rocky bank, which Captain David Inverarity, who discovered these shoals in the *India* in 1802, crossed over in 6 fathoms rocks, with several discoloured spots to the N. of her, which appeared much shoaler, in about lat. $17^{\circ} 39' S.$, lon. $38^{\circ} 32' E.$ This bank is a little outside the verge of soundings, and is probably very dangerous. When on it, the land was not seen from the mast-head. Great care is requisite when navigating in this neighbourhood.

Many whales of the black kind are seen; and the land may be generally discerned in 20 fathoms water. The winds of Sofala and Zambesia prevail from S. and S.E.; but in Dec., Jan., and Feb., the N.E. monsoon extends along this coast, and the current frequently sets to the S.W.; at other times it is very changeable.

PREMEIRA ISLANDS (Ilhas Premeiras, or First Islands) lie adjacent to the coast, and are the S. islands of the long chain off the district of Mozambique. They are small, and surrounded by reefs, with passages between them.

De Silva Island, a barren sand-bank, 10 ft. high, in lat. $17^{\circ} 18' S.$, and lon. $38^{\circ} 51' E.$, and about 18 m. E.N.E. of the David Shoals, is the W. islet of the Primeiras. Reefs extend off it $\frac{1}{2}$ m. A ship may pass in 14 and 15 fathoms, between it and Fogo, keeping nearer to the latter.

Fogo, or Fire Island, is nearly opposite Quizungo River, in lat. $17^{\circ} 14' S.$, lon. $38^{\circ} 54' E.$ This is E.N.E. about 5 m. from De Silva, and being thickly wooded, may be seen about 5 leagues from deck. Breakers project from it about a mile on all sides but the N., where vessels may anchor in 10 fathoms, about 4 cables off, with the centre of Island bearing S. by E. to S. by W. **Crown Island**, of sand, and 20 or 30 ft. above the sea, bears E.N.E. 4 m. from Fogo. There is deep water round all these islets, and between Crown and Casuarina Island.

Casuarina Island is about 4 leagues E. by N. of Fogo, and covered all over with Casuarina trees; wood here is abundant, but no water.

CASUARINA ROAD is the best anchorage along this coast. Entering from the N., keep Casuarina (seen from mast-head) open to *Right* of Epidendron, to pass clear *inside* of Barraco reef, and the reef N.E. of it. Anchor in 8 or 9 fathoms, with Casuarina S.S.E., and Epidendron E.S.E.

Epidendron Island, in lat. $17^{\circ} 4' S.$, lon. $39^{\circ} 9' E.$, $3\frac{1}{2}$ m. E. by N. from Casuarina, and 6 m. S. of Macalonda Point, is also thickly wooded. It is also called sometimes Raza, Flat, or Palm-trees Island. These Islands have reefs on all but their in-shore sides. In passing inside the Islands, a ship ought to keep much nearer to them than to the main, and will then have about 8, 9 and 10 fathoms water. To the E. of Casuarina and Epidendron Islands, at 3 leagues' distance, there is no ground with 60 fathoms; **Barraco Reef** is said to be about 3 m. or more to E.N.E. of Epidendron Island; and another reef, on which the sea is said to break, lies 2 m. further in the same direction.

Moma Bank, or Island, about 30 m. E.N.E. of Epidendron, is a sandy island, in lat. $16^{\circ} 47' S.$, lon. $39^{\circ} 34' E.$; and in the interval there are some reefs with breakers, between which and Moma there is a passage, and another with 8 and 10 fathoms water between the reefs and the Island. These Islands are all surrounded by extensive reefs. A bank with 5 fathoms lies 9 m. to S.W. by W. of Moma Island, and another shoal between them. Caldeira Point, or Black Rock, is 8 m. N by E. of Moma Island. **Caldeira Island**, in lat. $16^{\circ} 39' S.$, lon. $39^{\circ} 46' E.$, the W. one of the Angoxas, lies about 10 m. E.S.E. from the Black Rock, and 14 m. to E.N.E. of Moma.

ANGOXA, or ANGOZHA ISLANDS, lie parallel to the coast, about the same distance from it as Premeira Islands. Ships may pass between them, also between them and the coast, in 8 or 10 fathoms soft ground, by keeping nearer the Islands than to the main; but it would be imprudent to run through these channels in the night. Hurd Island is 6 m. to the N.E. of Caldeira. Between it and Mafamade Island, are two dangers called Michael Reef and Walker Bank. Mafamade Island, 20 m. N.E. by E. of Hurd Island, has lofty Casuarina trees, many of them 150 ft. high, visible at 5 or 6 leagues' distance. It is in lat. $16^{\circ} 20' S.$, lon. $40^{\circ} 4' E.$; a reef surrounds the Island, projecting farthest to the E. All these islands are small, none of them more than 2 or 3 m. in extent, and usually surrounded by reefs. To the N.W. of Mafamade, lies Angoxa River, the bar of which is very shallow, but frequented by the boats of Mozambique. Here the tide rises 13 ft.

Antonio Shoal, in lat. $16^{\circ} 8' S.$, lon. $40^{\circ} 12' E.$, lies 12 m. N.E. of Mafamade. It has two or three sand patches on its S.W. end, and is nearly covered at H. W. Passing through, between the shoal and the main, a ship should not approach the coast nearer than 7 fathoms, nor deepen more than 11 fathoms in the offing.

Huddart Shoal is in lat. $15^{\circ} 47' S.$, lon. $40^{\circ} 28' E.$; a dangerous rock, on which the sea does not break at H. W., about 8 leagues to the N.E. of Antonio Shoal, 6 or 7 m. from shore; to avoid which, a ship ought to keep in 20 fathoms water, or more, in passing along the coast at this place. When passing between Huddart Shoal and the main, from $3\frac{1}{2}$ to 5 fathoms is found.

Angoxa River, about 8 m. to N.E. of Mafamade, may be known by a clump of Casuarina trees on Monkey Island, on S. side of the entrance. Anchor off it in 7 fathoms L. W., with clump N.W. by W., Angoxa Point S.W. by W., and Mafamade S. by E., about 2 or 3 m. from shore. The town is a little way up the River. Natives are generally armed with spears and a few muskets, and are not to be trusted.

Mogincalc Shoal, between lat $15^{\circ} 33\frac{1}{2}' S.$, and $15^{\circ} 38' S.$, lies $4\frac{1}{2}$ to 5 m. off Mogincalc River, which is a high part of the coast. Caution is necessary, as the sea breaks on it at L. W. spring tides, but there are 2 or 3 fathoms on it at H. W. Between Mogincalc and Mokamba River, the coast should not be approached nearer than 20 fathoms, on account of another small shoal with only 3 fathoms, and about 3 leagues from shore: probably the Barracouta Reef, or rocky shoal, with only 7 or 8 ft. water, on which the *Firebrass* struck, in about lat. $15^{\circ} 30' S.$, and lon. $40^{\circ} 38' E.$, which projects about $2\frac{1}{2}$ m. from Barracouta Point.

Bajone Shoal, in lat. $15^{\circ} 27' S.$, lon. $40^{\circ} 42' E.$, lies about 6 or 7 m. E.N.E. from Barracouta Point, and 4 m. off the main-land abreast, and is dangerous, though there is a passage inside of it for small vessels.

Bajone Point, in lat. $15^{\circ} 12\frac{1}{2}' S.$, lon. $40^{\circ} 43\frac{1}{2}' E.$, is a projecting headland, forming the S. point of Mokamba Bay. This Bay has very deep water in the centre, and apparently also on its N. shore, but its S. shore is lined with reefs. Off its N. point, called Point Sunkool, are coral flats, which extend E. to St. Jago Island, and from thence in a N. direction to the Island of Mozambique.

Port Mokamba is at the head of Mokamba Bay, about 7 m. N.N.W. of Point Bajone. Its entrance, which is upwards of a mile wide, is in lat. $15^{\circ} 6' S.$, lon. $40^{\circ} 35' E.$ Point Mudge, the S. entrance point, has a reef projecting from it $1\frac{1}{2}$ m. to the E.; therefore, keep near to the N. side of the bay in approaching the Port, and borrow towards the N., or Mokamba Point, which is steep-to. About 2 m. inside Point Mudge, on the S. shore, is Point William, which has a detached rocky patch more than $\frac{1}{2}$ m. off it. Mudge and William points in one clear Mudge reef. The Port, which opens inside of Point William, is a spacious circular basin, with various depths, from 15 to 5 fathoms, where ships may lie land-locked; but there are some shoals near the shore, and at the S.W. part of the harbour, fronting the River Tumonia. The peak of Mokamba is on the N. shore, half a league within the point of that name, and about 2,000 ft. high. Bring Mokamba Peak, when entering the port, to bear W. by N. $\frac{1}{2}$ N., to clear the Peel Bank, $1\frac{1}{2}$ m. off Sancoul, on which reef H.M.S. *Snake* was wrecked. The bank, extending from the N. point of Mokamba Bay to Mozambique, is called St. Jago Bank, and is steep-to, rocky and very dangerous: the sea breaks on it in bad weather.

MOZAMBIQUE HARBOUR is one of the best on the E. coast of Africa; the land around is

mostly low near the sea, with tops of cocoa-nut trees in several places. Pao (round top) and Table (flat top) Mountains, the former about 22 m. to N.W., the latter 23 m. to the N., are remarkable in clear weather. The coast being very steep-to, soundings can be no guide. Therefore ascertain your latitude and longitude as often as possible in approaching Mozambique, for the currents are strong.

Sebastian Fort, at the E. end of Mozambique Island, in lat. $15^{\circ} 1' S.$, lon. $40^{\circ} 47' E.$, has a high flag-staff, and is the most prominent feature of the island, its walls being nearly 70 ft. high. Lorenzo Fort is at the S.W. end of the island.

Light. Two islands, St. Jago (wooded), and St. George (without trees), lie to the S. of the entrance. St. George, or Goa Island, is 3 m. S.E. by E. of Sebastian Fort, and nearly 2 m. to N.E. of St. Jago. A light-house on pillars is now being built on St. George, to show a *fixed* light, visible 14 m.

Cape Cabeceira, which bounds the harbour on the N. side, is a low bluff cliff with trees. A coral flat extends nearly 3 m. off it. This is called Pau Reef, or Cabeceira Shoal, and bounds the channel on the N. side. Near the N. end of this shoal, there is a small low island called Arbores, Tree Island, or Isle de Pau, with two smaller islets above a mile to the S. The S. head of Pau Reef bears about E. by S., and is distant 3 m. from Fort Sebastian.

The island of Mozambique, on which the city stands, is about $1\frac{1}{2}$ m. long, very narrow, and nearly midway between the entrance points of the inlet. On the N. side of the Island is the harbour, under the fort and town. St. Jago Bank, already mentioned, extends from Sancoul Point to St. Jago Island and Mozambique, and from thence to the main land; thus leaving no channel for shipping on the W. and S. sides of Mozambique Island.

The town is covered with buildings, and has a good landing-place in front of the Governor-General's palace. The population is about 7000. Coal is very dear, and only to be had in small quantities. Poultry, oranges and fruits of all kinds are plentiful. Fresh beef may be had at one day's notice.

This port depends on Madagascar and other places for supplies of provisions; bullocks are, therefore, not procurable under 15 dollars a head, and rice from 2 to 3 dollars per bag. Water is a scarce article when the harbour abounds in shipping, there being only two good wells, one on the Island, the other on the main; the rest are all brackish, the water in them being only fit for cooking. The articles exported are ivory, Colombo root, gold brought from Zeno and Sofala, the latter in small quantities; also ambergris, some amber, and cowries. Slaves have been exported in great numbers.

THE NORTH CHANNEL is said to have a coral knoll with $2\frac{1}{2}$ fathoms, but no directions are given about it. Entering the harbour, steer for St. George, giving a berth of $\frac{1}{4}$ m. to the N.E. end, from which projects a reef of rocks. Having passed this island on the N. side, steer N.W. by W. for the flag-staff of Mozambique Fort, keeping Pao Mountain open a little with the N. Bastion, if the wind is N.; and on with it, if the wind be S., which will carry a ship up with a low church at the foot of the N.E. angle; from which a spit projects to the E. about 300 yards, dry at L. W. spring-tides, and steep-to. The pilots have no mark for this spit, but guess their distance from the Fort and Cabeceira Shoal, which is generally discernible by green water on it. When Tree Island comes on with Cape Cabeceira, haul up N. by W. for the Narrows, allowing for tide, which runs strong here. When the wharf end opens of the fort wall, haul to N.W., steer along the N. face of the island, and anchor as convenient about 2 cables off. Within the harbour, the Leven Banks may be said to be the only obstacles to free navigation, and these are not 3 cables' length off the N.W. end of the island. Between them and Mozambique is the best and most commodious anchorage; the outer reefs are always sufficiently visible by day.

When approaching Mozambique from the N., do not let the S.E. point of St. Jago disappear behind St. George, or you will be too near the Cabeceira shoals. When entering by the North Channel, the Cabeceira reefs are always sufficiently manifest on the outside, but the rocky flat and the coral knoll are in the way of large ships. Bring the N. extreme of Mozambique Fort N.W. $\frac{1}{4}$ W., or Pao Mountain, over the white buildings on Point Mapéte, nearly on that bearing: this will lead clear in through the Narrows; and when Kisumbo and its village are open to the N. of the fort, a ship may haul close round the foot of the fort and choose her anchorage. To avoid the S. point of the Harp-shell Spit, which extends a mile off shore, or Cabeceira sands, the Pao Mountain may be kept on, or but little open to the N. of the fort, until Tree Island be quite shut in with Cape Cabeceira, when the Pao may be brought on with the white buildings of Mapéte, as before directed.

The South Channel has two coral knolls with 3 fathoms, so large ships should avoid it. But this passage between St. George and St. Jago, with a S. wind, may be taken by small ships coming

from the S., it being nearer. Keep mid-channel between these islands until Tree Island is open to the W. of St. George, then steer for Cabeceira Church, or the N. angle of Mozambique Fort, if the wind is scant from the W., which will carry a ship over the sand-banks that lie to the W. of St. George Island, in 3 to 3½ fathoms at L. W. spring-tides; and having opened Pao Mountain with the fort, observe the former directions. The passage to the S. of Mozambique is only fit for boats.

Pilots. When inside of St. George Island, a ship may anchor and make the signal for a pilot. One generally boards vessels within 2 m. of Sebastian Fort, and will take you to the Inner Anchorage.

In the proper channel to the N. of St. George Island, the general depths are from 7 to 10 fathoms in passing the island, and from 6 to 8 fathoms in sailing from it to the fort, with Pao Mountain a little open from the N. Bastion. To the W. of the fort, the water becomes more shoal, the general depths being from 3 to 4 fathoms abreast the town, about 2 cables off, where the ships moor. When past the fort, a ship, in steering for the anchorage, should keep near the shore, on account of the *Leven* bank of sand, distant ½ m. from the town, with 2 fathoms on it at L. W. spring-tides. Ships may moor a little within the fort, before they come to the *Leven* bank, or betwixt it and the town, at discretion. From Mozambique Island the harbour extends in a N.W. direction for 5 m., and is about 1½ m. in breadth between the banks which line each shore; the general depths being from 4½ to 6 fathoms at L. W. About 2 m. from the upper end of the harbour, there is a cove or inner harbour, with 4 and 5 fathoms water; and two rivers fall into it, near which are some villages and garden-houses.

Variation.—Tides.—Currents. Variation is at Mozambique, 14° W. It is H. W. on F. and C. of moon at 4 h. 15 m. The rise of tide 12 ft. The set of the tides is not noticed in the Admiralty directions, but they must greatly affect the steering. The current always runs to S. off this place, strongest in the N.E. monsoon.

The Winds on the coast about Mozambique are N. from Oct. to April, and from the S. during the rest of year.

Tree Island, or *Isle de Pau*, having straggling trees on its N.E. end, stands on the N.E. extreme of the shoal which extends nearly 3 m. to N.E. off Cabeceira Point.

PORT CONDUCIA, to the N. of Mozambique, from which it is separated by the peninsula of Cabeceira; is a fine-land-locked harbour, nearly 3 m. wide at its entrance, between Point Conducia and Kissangula, or Sombrero Islet; the shore on both sides is fronted with shoal banks to the mouth of Conducia River, which is 7 m. to the W. of Kissangula Isle. The depths are mostly from 8 to 5 fathoms, towards the W. part of the port, from whence the passage, having 3½ to 5 and 6 fathoms in it, winds between the banks on each side, round the N. point that forms the entrance of the river or inner harbour, which seems perfectly secure, with depths from 6 to 4 fathoms.

The Bay of Conducia is 6 m. wide at its entrance, between Tree Island on the S., and Quitangonya or Titangonha Island on the N.; its general depths, as far as examined, appear to vary from 6 to 16 fathoms. If bound in to Conducia River from the N., haul round the S. point of Quitangonya, steering W. by S. ½ S. for Cape Conducia, which is the N.E. cliff and elevated ground of the peninsula of Cabeceira; and when the two little points (which are the only rocks to the W. of Sombrero Islet) bear N. by W. ½ W., and Table Mountain is open to the W. of them, a ship may steer in N.N.W. ½ W., and coast the N. shore, into anchorage as she may choose.

In entering Conducia Bay from the S., with a commanding wind to stem the current, round Tree Island as close as convenient, and steer N. by W. ½ W. for Table Mountain, just open of the pointlets; when Cape Conducia bears W.S.W. steer N.W. by N., and afterwards by the plan, the lead, and the eye, as convenient.

Quitangonya, or Titangonha, Island, is in lat. 14° 52' S., lon. 40° 50' E., forming the N. boundary of Conducia Bay. It is 6 m. to N.E. of Tree Island, and 3 m. to E. by N. of Sombrero Islet. **Table Mountain** is in lat. 14° 41' S., and lon. 40° 40' E.; and looks from a distance like a flat island.

Current. There is a perpetual current down the coast, and its greatest velocity is precisely from the island of Quitangonya to Cape Bajone, and close to the outer reefs; so that during the N.E. monsoon, ships desirous of entering Mozambique, or either of its adjacent ports, must make the land well to the N. between Cape Loguno and Quitangonya. But when a ship is within the line of outer reefs, the current will be no longer felt, and she will be in the tide-way only. The current is always weakest at spring tides, when they of course are strongest.

Port Velhaco, more sheltered than Conducia from N.W. winds, and situated to the N. of Quitangonya, has 4 fathoms in the entrance.

FERNANDO VELOSO BAY. The land near the sea is low at the back of Velhaco Point.

and takes a N. by E. $\frac{1}{2}$ E. direction for 22 m. to Quisimajulo River. About 5 m. farther, **Cape Melamo**, in lat. $14^{\circ} 25' S.$, lon. $40^{\circ} 52' E.$, stands out, to the W. of which lies Fernando Veloso Bay, said to be spacious and safe, with deep water from 7 to 20 fathoms, and affording good anchorage on the W. side, within the entrance. **Cape Mocuo**, the N. point of the above Bay, is 3 leagues to the N. of Cape Melamo. Belmore Harbour is to the W. of the hilly land which stands to W. of Cape Mocuo. From hence it is about 10 m. to Point Loguno, a level headland, with cliffs about 80 ft. high, in lat. $14^{\circ} 12' S.$, lon. $40^{\circ} 45' E.$, abreast of which, projecting about 2 leagues from shore, is the dangerous **Pinda Shoal**, in lat. $14^{\circ} 15' S.$, lon. $40^{\circ} 51' E.$, making it prudent to keep 3 leagues from the coast in passing along here. Opposite to the N. point of this reef is **Memba Bay**, extending 4 leagues or more inland, with Tembo River at the N.W. angle. The water is very deep in the centre of the Bay, but it is said that ships may anchor in good ground on its N. side, sheltered from all winds, and find plenty of fish, wood, and water.

From Point Loguno to Sangone or Samooka River, is N. about 5 leagues; and from hence to Sorisa Point about $8\frac{1}{2}$ leagues, from which point Mancabala Reef extends 6 m. to the S. About 2 m. S. from the extreme of Mancabala Reef, **Indujo Reef** is situated, in lat. $13^{\circ} 39' S.$, extending E. and W. about a mile. Between these dangerous reefs there is a channel, with 5 and 11 fathoms water, and betwixt them and the coast the depths are from 7 to 10 fathoms. Almeida Bay is to the W. of Mancabala Reef, and affords safe anchorage in all winds in from 6 to 4 fathoms. The River Minsangegy is to the S.W. of Indujo Reef, about $3\frac{1}{2}$ m., and near the point that forms the S. part of Almeida Bay. **Sorisa Point**, in lat. $13^{\circ} 38' S.$, lon. $40^{\circ} 37' E.$, is low and sandy. Variation $14^{\circ} W.$

The Coast, from Memba Bay to Sorisa Point, is generally level, about 200 ft. high a mile inland, and low at the shore. Several very remarkable hills extend inland, some of them being sharp craggy mountains. These peaks are the best mark for this part of the coast.

Point Badgely, or Pando Point, bears from Sorisa Point N. by E. 10 m., **Lurio Bay** being formed between them, with soundings of 15 to 5 fathoms. Lurio River, on the ebb tide, discolours the sea several miles off shore. From Point Badgely to Point Maunhané, in lat. $12^{\circ} 56\frac{1}{2}' S.$, lon. $40^{\circ} 38' E.$, the coast extends N. and N.N.E. about 9 leagues, having soundings near it, but fronted by a reef, projecting in some places above a mile from shore.

POMBA BAY, sometimes called Memba, is 6 m. to the W. of Point Maunhané, and is $1\frac{1}{2}$ m. wide at the entrance. The N. point is in lat. $12^{\circ} 55\frac{1}{2}' S.$, lon. $40^{\circ} 33' E.$, being bold to approach, and the land on the S. side, which is all high, may also be approached within $\frac{1}{2}$ m. This Bay is an excellent harbour, opening into a large oblong basin, about 8 m. in length, N. and S., and $4\frac{1}{2}$ m. in breadth, with depths mostly from 18 to 7 fathoms, decreasing towards the edges of the reefs and banks that surround the Bay. The course in is W. by N. $\frac{1}{2}$ N., and when within the points, a ship may haul either to the N. or S., and anchor completely land-locked in 9 or 10 fathoms, good holding ground, about 3 m. to N.W. of the N. point, just touching Maunhané Point. A few bullocks, also poultry and vegetables may be got; and wood may be cut at Pomba, which is under the Sultan of Zanzibar. **Mutine Shoal** is a rocky patch, with only 8 ft., 2 m. within the entrance, W. of the N. point. There is another coral reef about a mile S. of the former. The W. part of the Bay is not to be approached within $1\frac{1}{2}$ m., being very foul and shoal; in hauling to the N. or S. for anchorage, do not approach the E. land within $\frac{1}{2}$ m., as a reef projects therefrom. H. W. on F. and C. at 4 h.; springs rise 15 ft. neaps 11 ft. At $2\frac{1}{2}$ m. to the N.E. of Point Maunhané lies Imbo bank of soundings, where anchorage may be got in 9 to 16 fathoms.

Areemba Point, in lat. $12^{\circ} 38' S.$, lon. $40^{\circ} 39\frac{1}{2}' E.$, distant $6\frac{1}{2}$ leagues N.N.E. from Point Maunhané, is the S. boundary of the Querimba Islands, as the first of these, Quipao, is united with the S. extreme of Areemba Point by a reef, which forms a cove or small harbour at the W. side of Quipao, with from 5 or 6 to 4 and 3 fathoms water. On the N. side of Areemba Point, betwixt it and the chain of reefs and islands to the N., there is a passage of 5 to 8 fathoms into Port Areemba, a harbour formed inside of the reef and island Quizeeva.

ASWATADA or QUERIMBA ISLANDS form a chain, extending along the coast from Point Areemba to Cape Delgado. A ship, in coasting along, ought to keep 5 or 6 leagues from the main, as several of the islands and reefs extend from it nearly that distance, and no soundings are in general to be had at $1\frac{1}{2}$ or 2 m. distance from the edges of reefs.

The Bank of St. Lazarus is a very extensive shoal, extending from 12 leagues E. of Ibo Island for nearly half way towards the peak of Comoro Island, and over nearly 20 m. of latitude, from $12^{\circ} 2' S.$, to $12^{\circ} 20' S.$ Several ships have sounded on different parts of it in 9 and 7 and 5 fathoms. Two vessels are said to have grounded in 3 fathoms. Therefore ships should avoid its limits; the lead will give sufficient warning of approach to danger. The existence of shoals, under the lee of the Comoro Islands, can well be accounted for, in the eddies of that perpetual current setting to the W. past Cape Ambre, the N. point of Madagascar.

The general direction of the Querimba Islands and Reefs, and the coast from Cape Maunhané to Cape Delgado, is *true* N. 45 leagues. In this distance there are 18 or 19 openings through the outer reefs into secure ports or convenient anchorages. The sea-faces of these islands and their reefs are very steep, having rarely any soundings alongside them; but for anchoring within the line between their seaward extremities, soundings may be expected in convenient depths. The dominion of the Portuguese seems to be acknowledged by the natives as far as lat. 11° S., but not to the N. of that, where the whole coast is subject to Seuheli chiefs, or to Arab usurpation.

The Querimba Isles are generally low, but some have a diversified surface of hill and dale. They were most of them in cultivation about a hundred years ago, but having been so long open to Arab and Malgash depredation, they have returned to their wilderness state: they are in general well wooded and easily seen from seaward. As no soundings are to be had near them, it is not safe to try to make them by night. Indeed this observation applies generally of the coast from Maleenda to Mozambique, with a few exceptions. The outer coral reefs of Querimba do almost all of them dry at L. W., or at half-tide, like those of Cape Delgado. The larger islands of this group are between lat. 12° 10' S. and 12° 27' S., and to these, rather than those farther N. towards Cape Delgado, the name of Querimba Islands belongs.

Foomo Island (the N. point, in lat. 12° 31' S., and lon. 40° 39' E.) is inhabited by Portuguese. It is connected with Quizeeva by a coral reef, which makes a small anchorage between these islands and the main; the entrance is between Quizeeva and Areemba Head.

Querimba, which gives name to the whole, is about 3½ m. in length, with a fort near the N. point of the island, which is in lat. 12° 24' S. and lon. 40° 39' E. Querimba was formerly the capital of the islands district. Montepes Settlement is to W. of it; the bay seems deep, but has been little examined. Quisanga Point forms the N. side of Montepes Bay, and projects towards Querimba and Ibo Islands.

Ibo Island is an establishment of the Portuguese, second only to Mozambique. The town has cocoa-nut trees and a white fort, which are at the N. part of the island, in lat. 12° 20' S., lon. 40° 38' E. This is the N.-most port of the Portuguese, and formerly a great resort of slavers. The population consists of Portuguese, Arabs, Banyans, and slaves. From mid-January to mid-March is the rainy and sickly season. Supplies are scarce. Ibo has a deep inlet on the N.W., and the S. part of the island is called Quirambo; this part being joined to the N. point of Querimba by islets and rocks. To the N. of Ibo there is a channel with 6 and 7 fathoms water, leading to anchorage inside reefs; this channel is bounded on the S. side by a reef projecting from Ibo, and on the N. side by Corea de St. Gonzalo Reef, which has another smaller channel between it and the reef that projects from the S. end of Matemo. The reefs may be perceived by discoloured water, and outside of them a ship may anchor in necessity, and also off the edge of the reef joining Ibo and Querimba, in calms. The anchorage at Ibo, partly exposed to E. winds, seems only proper for small ships drawing 14 or 15 ft., which might find good shelter by anchoring inside of Ibo reefs. It is H. W. about 4 h. on F. and C. of moon; rise of water about 7 ft.

Matemo Island, in lat. 12° 13½' S., has straggling bushes, but no cocoa-nut trees; its centre bearing *true* N. from Ibo. Matemo has a channel between it and the main, affording convenient anchorage in either monsoon, with from 3½ to 7 fathoms water, and passages both to the N. and S., with 7 and 10 fathoms water in them. Das Rolas, is a small uninhabited island, 2½ m. to the N. of Matemo, having good anchorage in from 7 to 9 fathoms ¼ m. off its S.W. side.

Mahato Island, in lat. 11° 59' S., has also a passage for small vessels inside from the N., between it and the isles and reefs fronting Pangane Point on the main.

Sangane Point is 6 m. N. of Das Rolas, and Pangane Point is 5 m. further N. The passage between the latter and Mahato is only fit for boats.

The Coast from Ibo Island, in some places has undulations, forming large bays, with some safe harbours inside the islands and reefs. The whole of the coast is low, with many small islands and reefs fronting it; a ship should, therefore, preserve an offing of 5 or 6 leagues in sailing along, to avoid the dangers in this space; more particularly as the land can only be seen at a small distance. The country vessels pass inside the islands and reefs, in sailing from one place to another. **Mattos Island**, in lat. 11° 49' S., lon. 40° 38' E., 10 m. N.N.E. of Mahato, is on an extensive reef which projects 3 m. to N.E., about as far to S.W., and to Shanga Islet on the W. Between the latter and Peguin Point there is anchorage, with depths of 14 to 9 fathoms, to the N. of Pantaloon Shoal (2½ fathoms) lying about midway between Mahato and Mattos. There is also anchorage between the mainland and the isles and reefs of Mattos and Shanga, which may be entered either from the N. or S.

Zanga Islet, called also Passeros and Sparrow, in lat. 11° 38' S., lon. 40° 35' E., stands 10 m. to N. of Mattos, on the great **Passeros Reef** which extends from the islet about 5 m. to E.

and to S.E., and is dangerous, being 13 m. from the main land. This must be the reef on which the *Margaret* of Calcutta was wrecked; but Captain Georgeson's reported latitude was $11^{\circ} 27' S.$

Point Vela, the S. extreme of Mazimba Bay, is 30 m. to N. by E. of Peguin Point. Minhouje Islet stands on the reef projecting 5 m. from Vela. Between this reef and those forming Minhouje Pass, there are good depths for anchoring. H.M.S. *Mutine* found a bank of 7 to 9 fathoms in $11^{\circ} 25\frac{1}{2}' S.$, at the entrance of the Minhouje Pass.

Numba and Mistunso are two islands on a large coral reef to E. of Mazimba Bay. Numba, the outer island, in lat. $11^{\circ} 9' S.$, lon. $40^{\circ} 43' E.$, standing 40 m. N. by E. from Mattos Island, is the highest of all the Querimba Islands, having hills of more than 300 ft. elevation. There is a passage into Mazimba Bay to the S. of Numba, but take care of the extensive coral reef (forming the N. side of the Luhamba Pass) to the E. of Zuno Islet, by keeping about 1 league off both Numba and Mistunso.

Port Mazimba, nominally under Portuguese control, has about 5 fathoms, muddy bottom, inside an island, Lupululu; but a native pilot is needed. Mazimba has a few exports to Ibo and Mozambique.

Amiza, about 6 m. to N. of Numba, the largest of the Querimba Islands, being nearly 8 m. long. E. and W., has low hills, and abundance of water, being well wooded. The Portuguese had an establishment here, but removed to Molurio, about 7 m. to W.N.W., in Maiyapa Bay.

Longa and Tikoma are two islands on a reef between Amiza and Cape Delgado.

CAPE DELGADO, in lat. $10^{\circ} 41' S.$, lon. $40^{\circ} 40' E.$, being rather a low point, is not easily distinguished from the islands to the S., the nearest of which, Tikoma Island, is about 4 m. from the Cape. The safe bay of Tonghy is formed on the W. side of the island of Tikoma. The channel into this bay is between the island and the Cape, with depths from 30 fathoms at the entrance, to 7 or 6 fathoms inside: the course in is W. by N. $\frac{1}{2}$ N. and W. $\frac{1}{2}$ N., and mid-channel is the best track, as a reef projects from the Cape, and another from the N.E. part of Tikoma $1\frac{1}{2}$ m.; when round the latter, haul to the S.W. and anchor near the W. point of the reef that projects from the island; or in N. winds, a ship may anchor in the N.W. part of the bay in 5 or 6 fathoms, about 5 m. W.S.W. of the Cape, opposite to Minene River. Tonghy Fort is $3\frac{1}{2}$ m. to the W. of Cape Delgado, in the N. part of the bay.

The Coast, N. of Delgado. A reef projects from the cape into the sea $1\frac{1}{2}$ m., and from hence the land takes a N. by W. direction to Nizimbary Island, in lat. $10^{\circ} 20' S.$, on the N. side of Rovuma Bay. The S. side of that Bay, called Cape Rovuma, has an extensive reef, with the *Lyra* shoal off it, nearly 3 m. to N.E. of the wooded cape.

Rovuma River (said to have no bar) was ascended in boats by Dr. Livingstone for 150 m. in Oct., 1862. There is good anchorage in Rovuma Bay, off the N. or S. shore, according to Monsoon. From the N. point of Mizimbary Island, other smaller islands extend in a N.W. direction, about 6 m. parallel to the coast, chained together by reefs; thence the general line is N.W. by W. to Lindy River. About half-way between Cape Delgado and Keelwa, near Lindy River, there is a remarkable mountain, with three elevated hummocks on it of an hemispherical form.

Monghow or Mungulho River, entrance in lat. $10^{\circ} 8' S.$, lon. $40^{\circ} 2' E.$, is about $\frac{1}{2}$ m. wide, and rather difficult of access, with from 14 to 7 fathoms in the fair channel; reefs project from the E. point of the river $1\frac{1}{2}$ m., and from the W. $1\frac{1}{2}$ m. This place is not easily distinguished, the village of Monghow is a little within the E. point of the River. The depths in the River are mostly from 8 to 12 fathoms up to the anchorage; and it is H. W. at $4\frac{1}{2}$ h. on F. and C. of moon. Wood is easily procured, but water with difficulty. The Arabs trade to this place for ivory, and slaves were sent from hence to Quiloa.

Lindy River, in lat. $9^{\circ} 59' S.$, lon. $39^{\circ} 45' E.$ (the Fort), about 5 or 6 leagues from Monghow, and $22\frac{1}{2}$ leagues to the N.W. of Cape Delgado, is large, easy of access, with several villages on its banks, the principal of which is Lindy, with its fort on the W. side, where the River contracts to $\frac{1}{2}$ m. navigable. The land about Lindy River is high, averaging 700 ft. Mount Trinidad, about 1000 ft. high, stands on the right bank of the River, about 6 m. to S. of Lindy Fort, which has an Arab chief subject to Zanzibar. The S. shore ought not to be approached close; mid-channel is the best track, when a little inside of Point Kiremba, or Querimba, which is the outer point on the N. side of River. The depths are over 40 fathoms in the entrance, decreasing quickly to 8, 5, and 4 fathoms, at $2\frac{1}{2}$ m. from the village of Lindy. This appears to be an excellent harbour; but supplies are scarce; wood and water may be easily procured; the watering place is a little outside of Lindy, on the opposite shore, in a creek near Esmant Village. There is good anchorage in the outer bay wherever soundings may be had, and about a mile N. of Point Esmant (the S. point of Lindy Bay), is a very good stopping-place in 4 or 5 fathoms. It is H. W. at $4\frac{1}{2}$ h. on F. and C. of the moon, and the rise of tide is 12 ft. Variation $12^{\circ} W.$

The Coast, from Lindy River to Keelwa, extends N. $\frac{1}{2}$ E. 19 leagues, having some indentations, among which are Masoonga River, in lat. $9^{\circ} 45' S.$, lon. $39^{\circ} 47' E.$; and Kiswara River, in lat. $9^{\circ} 26' S.$, lon. $39^{\circ} 39' E.$ The latter may be known by Piccolomini conical hill, about 500 ft. high, which is about 3 leagues W.N.W. from Kiswara Bay. The N. side of the Bay has table-land, 200 ft. high.

KEELWA, or QUILLOA HARBOUR, is 4 m. in extent from N. to S., and on the N.W. end the town and fort of Keelwa are situated, in lat. $8^{\circ} 57' S.$, lon. $39^{\circ} 34' E.$ There are two passages into this port, which form two harbours, one to the N., called Port Beaver, and one to the S. of the island, having from 20 to 8 or 10 fathoms in the latter, and from 30 to 12 fathoms in the former; either of which may be chosen. Ships entering the N. harbour, the channel to which is about $\frac{1}{2}$ m. wide between the reefs at the entrance, usually anchor at the N.W. part of the island, abreast of the fort and town. A bank of shoal water extends from the N.W. point of the island to the main land, having only 1 and $1\frac{1}{2}$ fathoms on it at L. W.; but small vessels may pass over it at H. W., from the N. to the S. harbour, as the tide rises 13 ft. at springs and 9 ft. at neaps.

Port Pactolus, which is to W. of Songa Manara Island, is the S. harbour, having 9 or 10 fathoms. Pagoda Point, the N. end of Songa Manara, has a coral flat, with the Direction rocks (always visible) on it, stretching nearly a mile to N.E. On the other side, there is a smaller reef off Fishery Point, the S.E. extreme of Keelwa Island. Both Keelwa and Pactolus inlets extend a good way inland; both have in them several islets and shoals, with depths sufficient for ships of any size to a considerable distance.

The Entrance of Port Pactolus, between the reefs off Fishery Point (the S.E. point of Keelwa Island) and Pagoda Point, is $\frac{1}{2}$ m. wide. Enter at half-tide or L. W., and the way will be clearly seen. The most convenient anchorage is about midway from the S. shore of Keelwa Island, between it and Pactolus Bank; but vessels sometimes haul close within Pagoda Point, and anchor between it and Morice Island. Keelwa Island is nearly surrounded by a reef, and the points which form the entrances to the harbours have reefs projecting $\frac{1}{2}$ m. from them. Ukyera Reef, projecting from the N. entrance-point of Port Beaver, extends about 5 m. to seaward in an E. direction, and is quite steep on its E. and S. sides. It has many spots on it always dry, on some of which are trees, and the entire surface of the reef, which is very extensive, is either dry or awash at L. W. ordinary tides.

Cape Keelwa, in lat. $8^{\circ} 54' S.$, lon. $39^{\circ} 36' E.$, the N. entrance point, is readily known, being low and sandy, with several trees near it on the inner part of the reef. Soonga Manara, or Pagoda Point, is also low, and is situated in lat. $9^{\circ} 2' S.$, lon. $39^{\circ} 37' E.$ To the N. of Port Keelwa there are several hills inland, called Ganghera Hills; but all the coast about this harbour is low, covered with mangroves, which, retaining the mud, make banks and islands, rendering it unhealthy. Keelwa, formerly taken and held by the Portuguese, was found unhealthy, and so abandoned. It is now under the Sultan of Zanzibar. Water and provisions may be procured at this place, but few ships touch here at present. The natives have in general been considered unfriendly to strangers. H. W. on F. and C. at 4 h. 45 m. Variation $12^{\circ} W.$

Directions. Coming from the N., the sea-board of Ukyera Reef is as easily distinguishable by day as the shores of the land, and it may be coasted as close as convenient. Be careful to avoid the *Orestes* Shoal, which has 3 fathoms, lying off shore 5 m., and about 4 m. to N.N.E. of the S.E. tip of Ukyera. No soundings will be had near it until $\frac{1}{2}$ m. off the S.E. point of Ukyera Reef, and half a league from the shore of Cape Keelwa; this is a convenient spot for anchorage sometimes in the N.E. monsoon, when there is not day enough to enter the ports. E. winds prevail here in the form of strong sea-breezes most of the year, and occasion a considerable swell from seaward, so that if the wind fall light, and a ship be embayed here, it is sometimes a difficult and anxious work to get out; this consideration gives more importance to the only ground, just named, where a vessel can possibly anchor. To enter Port Beaver, bring the fort just on with the N. extreme of Point Philip (the N.E. point of Keelwa Island), or bearing about W., until the cliffs of Cape Keelwa be shut in behind its S.E. extreme point, or be in one with it; then steer W.N.W. for the second break in the shore, N. of Point Emerika (the S. point of Cape Keelwa peninsula): this with open eyes will lead clear through the Narrows, when a ship may steer in mid-channel towards the fort. **Dangers.** There are shoals on N. part of Philip Reef, and on S. part of Cape Keelwa Reef, which form the Narrows, where the channel is not more than $\frac{1}{2}$ m. wide. Strangers had better place a boat on each of these shoals for marks, and when within the Narrows, the cliff being open to the W. of the N.W. point of Philip, a ship may steer as she will, the N. shore of Keelwa Island being clean almost to the town, as is also Point Emerika; but the shores on the E. side of this point are foul, except near the N. cliff. A vessel when inside may choose her anchorage, but the most convenient depths are N. of the fort. To enter either Port Beaver or Pactolus, in the S.W. monsoon, or from the S., a ship should make the land about Rohanga or

Kiswara to the S., where the shore is very clean and land high and bold; and coast the reefs to N. and enter by eye, or when Fishery Point bears W. by N. she may steer for it until Morice Island bears S.S.W., and then proceed as before,

The Coast projects at Quiloa Point, about 7 m. to N. of Cape Keelwa, and thence a chain of reefs, with probably good passages between them, extends to Monfea Island.

Keelwa Kivinja is a town of importance, about 9 m. N.W. from Quiloa Point, having sheltered anchorage about 2 m. N. of the town, with 5 and 6 fathoms, inside some reefs, but landing is bad, except at H. W. This town is the largest between Mozambique and Zanzibar, having a population of more than 12,000; and it is the principal place for export of slaves. The journey hence to Lake Nyassa occupies between a fortnight and three weeks.

Above Keelwa Kivinja, for 40 m. to Lufji River, the navigation is obstructed by many reefs, as yet unexamined; but they break the ocean swell, and anchorage is found everywhere in from 8 to 6 fathoms. Navigation between them and the main may be attempted at L. W., with a boat ahead sounding. Songa Island is about 18 m. to N.E. of Keelwa Kivinja. Tree Island is 17 m. to N. of Songa, and the same distance to S.W. of Monfea Island.

Lufji River Delta lies to the W. of Monfea Island, but is unsurveyed and little known. H.M.S. *Brisk* found a good mouth in lat. $8^{\circ} 6' S.$, having 3 fathoms on the bar at H. W., and deepening to 6 fathoms inside. Shoals lie off this to S.E., and Sunaya Island stands about 12 m. to N.E. by N. The chart gives no soundings whatever about this part.

MONFEA ISLAND extends from lat. $8^{\circ} 2' S.$, to Point Moresby, the N. end, in lat. $7^{\circ} 38' S.$, lon. $39^{\circ} 58' E.$; it is narrow, and the first large island to the N. of Keelwa, but between them a chain of islands and reefs extends along the coast at the distance of 5 to $8\frac{1}{2}$ leagues, with a channel inside for small vessels. Monfea is also fronted by a reef along its E. side, and by islands and shoals on the inside, between it and the main. There is anchorage on its S. and W. sides, betwixt the reef which extends from it, and the adjacent group of islands and shoals. Care is requisite in approaching the S. part of the island, on account of extensive and steep coral reefs. **Point Moresby** (26 leagues N.N.E. from Keelwa) is well wooded, and visible about 15 m.; its reef extends off about half a league, and shows plainly at half-tide. The E. face of Monfea Island is very deep-to. Kissomang, the W. point of Monfea, in lat. $7^{\circ} 56' S.$, and lon. $39^{\circ} 38' E.$, is about 9 m. from the main land. It is a great resort of slave dhows for water and supplies. During the S.W. monsoon, good anchorage may be had on the N.W. coast of Monfea, but not in the N.E. monsoon. The Island is said to be fertile, and to afford water and provisions.

The Coast. Between Monfea and Zanzibar there are several islands near the main, and a passage along the coast, inside most of them, fit for small vessels. Point Pouna, in lat. $7^{\circ} 8' S.$, lon. $39^{\circ} 37\frac{1}{2}' E.$, is a projecting part of land. **Motumoka Point** is 11 m. to the N. of Pouna in the parallel of Latham Island; from this point the coast takes a N.W. by N. trend, about 20 leagues, forming the Bight of Zanzibar.

Latham Isle, in lat. $6^{\circ} 54' S.$, lon. $40^{\circ} 0' E.$, called Foongo by Arabs, bears N. by E., 44 m. from the N. end of Monfea, and is a small, low sandy islet, with a rocky projection from the E. part, and usually high breakers on rocks around. A bank of soundings from 5 to 18 fathoms extends about $2\frac{1}{2}$ m. to the N. of the isle, and to the E. 2 m., with from 6 to 25 fathoms on that part; but $\frac{1}{4}$ m. from the W. side there are 28 and 30 fathoms. This Isle was discovered by the India ship *Latham*. It is about 10 ft. elevated above H. W. mark, formed of coral, and its surface is rendered flat by the dung of the numerous sea-fowl which resort to it. Except on the S.W. side, it is difficult of access; it bears E. by N. 22 m. from **Pouna Point**, the nearest cape of the main land. Soundings are not obtainable in mid channel. Variation $11^{\circ} W.$

Dar Salaam, or Mozozina, in lat. $6^{\circ} 50' S.$, lon. $39^{\circ} 24' E.$, is about 14 leagues to S. of Zanzibar, and 11 leagues W. by N. from Latham Isle. This is a new port established by the Sultan of Zanzibar, affording good shelter inside for large vessels. The approach to the harbour is between Sindo Island and the Goonja Isles, and when between them the red cliffs (about 80 ft. high) of Dar Salaam will point it out. The shoal water at the entrance is marked by two buoys, nearly 2 cables apart, E.N.E. and W.S.W. from each other. A vessel should not shoal under 5 fathoms near the buoys, and will find 9 or 10 fathoms water midway between them; when she must haul up S.W. by W., keeping the left or S. point of a long sandy beach about a point on the starboard bow, and not shoaling under 5 fathoms towards the coral reefs on either side of the channel, which may be clearly seen from aloft, or in passing the sandy point; abreast of which the large expanse of harbour is seen and the vessel may anchor in 5 or 6 fathoms.

Goonja Isles lie about a league off the African Coast, and 6 leagues to S.W. of Ras Kizimkazi, the S. point of Zanzibar. **Tom Shoal** lies 7 m. to N. of the Goonjas, but the channel between it and Kwaly Island is 7 m. broad.

ZANZIBAR, called **ZUNGBAUR** by the Arabs, the largest island on this part of the coast, has a considerable trade carried on by the Arabs from Muscat, who also trade to most of the harbours on the E. coast of Africa for ivory. The E. side of the island is lined by a reef, and on the W. side are several small islands and shoals; reefs also project from the N. and S. points. The island, which is well planted and very fertile, is 46 m. long, N. and S., and 18 m. in greatest breadth. The Bweny hills, at the S. end, are about 300 ft. high, but the general elevation of the island does not exceed 100 ft. It is under the dominion of the Sultan of Zanzibar, and has a British Consul. The town of Zanzibar, or Shangany, on a low neck of sand with a shallow harbour for native boats on its E. and S.E. sides, has a dense population of Arabs, Banyas and Seedeas; the streets are narrow and dirty. The fort is on the sandy cape to S.W. of the town, but the houses are more conspicuous. The trade is mostly carried on by American and Hamburg ships, with occasionally French and English vessels. Bombay and Cutch kotias (dhows) pay annual visits. The exports are cloves, gum copal, orchilla-weed, cowries, ivory, horns and hides. The slave trade used to be a source of great wealth. It is now a depôt for provisioning H.M. ships. Native merchants can supply a limited quantity of salt meat and biscuit. Coal may sometimes be obtained. Wood is plentiful.

Port Zanzibar. The anchorage is sheltered from all winds by islands and banks, but the disastrous hurricane of April, 1879, should warn mariners to be careful where and how they place their vessels. Pilots sometimes come off in answer to a signal. It is said that buoys have recently been placed on the Maja and Larkbree Shoals, to define Menai Channel, the best S. entrance of the harbour. (*See* Remarks on Zanzibar, Chapter 7.)

Water used to be procured in Freshwater River, near the old palace, at Mtony village, but this was bad, and brought sickness to Europeans. Good pure water may now be procured at Bubooboo, 3 or 4 m. to N. of Mtony, and casks (or even a boat at H.W.) can be filled under wooden spouts. There is good anchorage off Bubooboo River in 8 or 10 fathoms. From religious scruples, the natives will not permit European ships to receive a supply of water from wells about the town. This place abounds with refreshments, bullocks, goats, poultry, rice, dholl, cocoa-nut oil, &c., with a variety of delicious fruits. The governor makes a monopoly of the sale of these articles, charging exorbitantly for them; the inhabitants, when permitted, sell their articles more reasonably. They go always armed, and appear timid, except when a considerable number are together. Europeans not seasoned to the climate ought not to sleep on shore, if it can possibly be avoided.

Zanzibar Fort is in lat. $6^{\circ} 9\frac{1}{2}'$ S., lon. $39^{\circ} 14\frac{1}{2}'$ E.; the N. point of the island, in lat. $5^{\circ} 48'$ S., lon. $39^{\circ} 21'$ E.; Ras Kizimkaz, or S. point, in lat. $6^{\circ} 27\frac{1}{2}'$ S., lon. $39^{\circ} 33'$ E.; Chuaka, or E. point, in lat. $6^{\circ} 3\frac{1}{2}'$ S., lon. $39^{\circ} 31'$ E. H. W. at 4 h. 20 m. on F. and C. of moon. Rise of tide 9 or 10 ft. Variation 10° W.

Directions for approaching Zanzibar from the S.—After passing a good league on either side of Latham Isle, Pouna Point, or another N. of it, will be seen bearing S.W. by W., and farther N., land rising into two mounts. Then the S. part of Zanzibar, and the islands that skirt its S.W. side. The reefs are discernible all the way, and with a good look-out, it is impossible to run into danger. Large ships should pass about a league to W. of Kwaly and Kissewa, the former islet being 3 leagues to W.N.W. of that S. point of Zanzibar. When these islands are passed, and open clear of that S. point, Choomby will be seen, having two small rocks off its S.E. end, called the Twins; at the same time the two small Ukombi Isles, Walnut and Nut Islands, will be seen to the E.: Bawy, or Turtle Island, with the three islands that form the harbour of Zanzibar, on a clear day, being likewise in sight from the mast-head. **Ariadne Bank**, with 3 fathoms, lies about 3 m. to S.S.W. of Choomby, and the *Lily* shoal is between. Therefore run to the N.W. after passing Kwaly Island, until the red cliffs (which are 3 m. S. of Zanzibar Fort) begin to show themselves to *left* of Choomby. Then steer N. by E., with Choomby more than a point on the starboard bow. When abreast of that island, there are four channels by which a ship may proceed to anchorage off the town. At L. W., all of them are safe, and may be adopted at discretion, as the banks and reefs show themselves, and are then steep-to; but at half-tide the Menai Channel is the best.

Menai Channel.—To go through this channel, double Choomby at $\frac{1}{4}$ m. distance: when the N. extreme bears E., steer N.N.E. in from 15 to 18 fathoms, at which time French Island will be seen from the mast-head, nearly on with the point of the town. On this course the soundings will decrease gradually to 9 or 8 fathoms, until Nut and Walnut Islands are in one. With Bluff Point bearing S.E., and the Town Point N.N.E. $\frac{1}{4}$ E., nearly on with French Island, the Middle Ground shoal, if at half tide, will be seen awash, or at high tide the shoal water over it right ahead about $\frac{1}{4}$ m. distant, and Menai Bank (which lies 1 m. to W. of Maja Point) will appear on the starboard bow, about $\frac{1}{4}$ m. To pass between the S.E. Larkbree shoal and that off Maja Point, haul up N.E.,

keeping Chukwany Point on the starboard bow, on which course there are from 7 to 9 fathoms until the latter point bears E. by S.; then a ship will be past all danger and may steer for Town Point, Chapany Island being nearly on with it. She will thus pass more than 1 m. off the sand bank at the E. end of Great Larkbree bank. This sand bank bounds the W. side of a very narrow passage, named *Imogene* Channel, to distinguish it from that named Menai Channel, but it should not be tried without a pilot. The pilots trust to the eye, shoals being visible at half tide, and at all other times from mast-head. The country vessels, large and small, enter or depart by the S. passage, according to the season.

In the S.W. Monsoon, it is better to make the land about Point Pouna, from which steer N. or N. by W. to make Kizimkaz; then steer N.W. for Kwaly Island, and pass it and Kissewa, at a convenient distance. When approaching Choomby Island from the S. by E. or S.S.E., beware of the *Lily* rocky shoal and Ariadne Bank S.S.W. 3 m. from Choomby Island. Pass about $\frac{1}{2}$ m. to W. of Choomby; then (to avoid a 4-fathoms patch), steer N. about 2 m. till Kumbeny Hill comes over Booya Point. Then, about N.N.E. with Chukwany, a point on the starboard bow, until Choomby bears S. $\frac{1}{2}$ W., and Chakwany from E. by N. to E.N.E.; then steer N. $\frac{1}{2}$ E. with Chapany just shut in with Shangany, and when Chakwany bears E.S.E., steer as convenient for any required berth. In coming in or going out, the Little Larkbree Sand, if seen, will be a sure guide, the channel being between it and the Maja Bank. Little Larkbree sand-bank is generally dry: is 4 m. N. by E. of Choomby Island, and $1\frac{1}{2}$ m. W. by S. of Chakwany Point.

Directions for entering Zanzibar Channel from the N. A ship intending to touch at this place during the N.E. monsoon in Dec. and Jan., should steer for the N. part of the island, giving it a berth of at least 1 m., to avoid a rocky ledge; and when off the N.W. end, two islands will be perceived near each other within the N. point. Tumbat the S. island, is of considerable extent N. and S.; the other, Moina, is small, and lies close to the N. point of Tumbat; if it be late in the evening, she may anchor near the W. side of Tumbat, in muddy ground, from 17 to 20 fathoms. In running along the W. side of Tumbat, the soundings are regular, at 1 or 2 m. from the island, and the course about S. by W.; but about 3 m. to the W. of its N. end there are over-falls of 9 or 10 fathoms on Tumbat Bank, which in some parts has 5 and 7 fathoms, and is supposed (though not examined) to extend towards Alek patch, which lies 10 m. to the W. of Moina Island. There is a good passage inside Tumbat Island, passing $\frac{1}{2}$ m. to E. of Benoth Islet, then S. to Kokotoni village, and W.S.W. towards Oswawemba Point. The shore between these two last places is thickly inhabited. Benoth Islet is $\frac{1}{2}$ m. to S.E. of Moina, and may be approached from a distance when bearing between S.S.W. and S.S.E.

From the N.W. end of Zanzibar, called Sandy Point, or Point Oswawemba, a bank is said to lie in a S.W. direction from 2 to 5 m. from the shore, having on it 2 fathoms fine sand; H.M.S. *Gorgon*, in 1864, passed over this bank on several occasions, in 6 and 7 fathoms; discoloured water makes it generally visible. To the S.S.W. of this, other shoals and Baudin Rock make it necessary to keep within 2 m. of the island. When past these banks there are regular soundings along the W. shore to the three islands, Chapany, Chango, and Bawy, situated to the N. of the town. Outside of these a ship may anchor, or go into the inner harbour at once; the dangers are generally visible, particularly at L. W.; and the pilots use no marks to carry ships into harbour.

English Pass, between French Island and Mtony village, is the best approach from the N. When you come near the E. island, called Chapany, or French Island, you will see the bank extending from it, which is partly dry at L. W., and by projecting nearly half way across, towards Zanzibar shore, makes the channel very narrow. Recently the edge of this bank has been marked by buoys. There is also a bank projecting a small distance from the village of Mtony, and forming an elbow along that shore. When you come near this bank, the S. point of Zanzibar Town will be open with Chapany. When Chapany and Chango Islands are in one, you are abreast the bank, and will have 6 fathoms, one or two casts; when the islands appear open of each other, you are past the shoal part, and may then steer for the S. point of Zanzibar, leaving an elbow of a bank near the shore on your port hand.

Anchor within a mile of the town in 7 fathoms mud. The S. point of Zanzibar will then bear S. by W., with Choomby, a distant island, a little open; the flag-staff on fort, or Governor's house, S. $\frac{1}{2}$ E.; the fresh water river, E. by N. 4 m.; Chapany Island, N.E. $\frac{1}{2}$ N., and the N.W. end of Zanzibar just visible between Chapany and the islet Kibandiko which is on the same reef. The reef environing the islands is mostly dry at L. W.; and at H. W. only navigable by boats. The island of Zanzibar in sailing along has a beautiful appearance, and is everywhere woody.

French Pass, between Chango and Kibandiko, is only 2 cables wide. No directions are given, except to keep nearer to Chango. At L. W. the reefs, dry in some places, define the channel.

Grand Pass. This channel to the W. of Chango, seems safe, by passing that island on the W. side at a little more than $\frac{1}{2}$ m. distance, as **Morgan rocky patch** lies rather more than a mile to N.W. of Chango Island. Chango reef extends nearly 2 m. S. by W. of it. **Chango Knoll**, its S. extremity, lies midway between Zanzibar Town and Bawy Island. Give the reef a berth, by keeping rather more than mid-channel towards Bawy Island, and when abreast of this island, or on the transit-line between its N. end and Zanzibar Fort, haul up to S.E., and then to E., for anchorage abreast the town.

Soundings. After leaving Zanzibar for Pemba, the *Menai* struck soundings on **Leven Bank**, lat. $5^{\circ} 39' S.$, lon. $39^{\circ} 20' E.$, in 14 fathoms, then had from $6\frac{1}{2}$ to 13 fathoms uneven ground; then suddenly lost soundings in steering out E.S.E.

PEMBA, called **Keddree**, or **Ul Huthera** (Green Island) by the natives, extends 12 or 13 leagues, nearly N. by E. and S. by W. The Point Kegomatchy, N.W. point, being in lat. $4^{\circ} 52' S.$, lon. $39^{\circ} 44' E.$ Cape Hay, the N.E. point, in lat. $4^{\circ} 54' S.$, lon. $39^{\circ} 53' E.$, has a fringing reef 1 m. to E. and to N., and anchorage to the W. of that in Port Wanyeeke (the space between Pemba Knolls and Cape Hay) in 7 or 8 fathoms, sheltered against the S.W. monsoon only. The S. end of Pemba, **Said Point**, in lat. $5^{\circ} 29\frac{1}{2}' S.$, lon. $39^{\circ} 42' E.$ bears E.N.E. 8 leagues from the N. point of Zanzibar. This channel has never been thoroughly sounded, but is believed to be deep and safe, except near Leven Bank.

Pemba Island is low, well wooded, and fertile; rice is cultivated and carried to Zanzibar: the E. shore is nearly straight, N.N.E. and S.S.W., and lined by a reef, requiring caution when near it in the night, being steep-to: the W. shore is irregular and deeply indented in its outline, having a chain of islands and reefs fronting it, by which several bays and harbours are formed. The chief of these, Chak-Chak Bay, is inside Mesal Island, in lat. $5^{\circ} 15' S.$, lon. $39^{\circ} 44\frac{1}{2}' E.$, from whence a channel leads to Port Cockburn, on the N. side of a long narrow peninsula that separates them. Port Campbell, or George, is in lat. $5^{\circ} 4' S.$, having also a channel leading from the former harbours, which channel extends inside the chain of islands and reefs nearly to the N.W. end of Pemba, and there are several gaps in this chain, affording passages to the harbours inside. **Pemba Channel.*** There is a broad channel betwixt Pemba and the main, but it is contracted to 4 or 5 leagues by reefs and islets projecting 2 to 3 leagues from the main land in some places, and very steep-to. The current in the channel appears to run with great force, violently agitating the sea. Even in Dec., when the northerly monsoon is at its height, the current runs nearly 1 knot per hour to the N.; but in the S.W. monsoon, fully 3 knots to the N., past Zanzibar and Pemba. **Pemba Knolls**, a labyrinth of coral rocks, lie off the N. end of Pemba, 5 or 6 m. off the shore, which is very shoal between Cape Hay and Kegomatchy Point. Arab dhows find anchorage amongst them in the S.W. monsoon. On the W. side of the N.W. point, a ship may (it is said, but the chart does not show such a place) anchor opposite to the small sandy bay; but a reef of 2 m. extent to the N.E. must be avoided.

Tides. H. W. at Mesal Island, at $4\frac{1}{2}$ h. on F. and C. of moon; rise 12 ft.

THE AFRICAN COAST, from Dar Salaam (page 99) trends to N.N.W., 11 leagues to Cape Thomas, to the W. of which there is a deep bight, but little sounded or known. Currents, which sweep up past Delgado to the N. for nine-tenths of the year, must bring much earthy matter from the mouths of such rivers, as Rovuma, Ruhuhu, Lufiji, Kingani and Pangani. In the still water, in-shore of Zanzibar Island, much silt must be deposited; shoals doubtless abound there. The chart shows that shoal patches have been found in every track hitherto made by ships; of these we mention **Tom Shoal Breakers**, at 2 leagues N. by W. of Goonja Island; **Ross and Albert Reefs** to the N.W. of Cape Thomas; **Emerie Shoal** (6 ft.) at 1 league off the main, in lat. $5^{\circ} 53' S.$; **Mazeewy Shoals**, scattered over 12 m. to S.S.W. of Mazeewy Island, which is in lat. $5^{\circ} 30' S.$, lon. $39^{\circ} 9' E.$, and $4\frac{1}{2}$ m. to the S.E. of Pangani Bay. Thence to the N.N.E. for 15 leagues, the coast is fronted by the **Waseen Reefs**, which lie from 1 to 2 leagues off shore; they are said to have good depths inside them, but are steep-to along their sea-face.

Waseen Cape, in lat. $4^{\circ} 39' S.$, lon. $39^{\circ} 30' E.$, to the N. of Waseen Island, bears N.E. by N. 18 leagues from Mazeewy Island, and N.W. $\frac{1}{2}$ N. $6\frac{1}{2}$ leagues from Kegomatchy, the N.W. point of Pemba. There is safe anchorage in all winds in the narrow channel between Waseen Island and the Cape, but the latter must be borrowed upon, because a shoal extends 2 m. to E. of the island. Waseen Peaks, about 2,500 ft. high, stand 4 leagues to N.W. by N. from the Cape; they may be seen in clear weather for some 15 leagues. Tanga and Chala Bays are but little known.

* See Admiralty Chart, No. 664; E. Coast of Africa, with Zanzibar and Pemba.

CHAPTER VII.

ZANZIBAR TO SOCOTRA AND ADEN.

MOMBASA—JUBA ISLANDS—MUKDEESHA—RAS HAFOON—GUARDAFUI—SOCOTRA ISLAND—ABD-AL-KOORY—RAS FEELOOK—MEYT ISLAND—BERBEREH—ZEYLA—TEJOOREH—OBOKH—PERIM ISLAND
BAB-EL MANDEB—RAS ARRAR—ADEN—WINDS AND WEATHER—POPULATION—TRADE.

(VARIATION AT ZANZIBAR, 10° W.; AT SOCOTRA, 2° W.; AT GUARDAFUI, 3° W.; AT BERBEREH, 4° W.; AT PERIM, $4\frac{1}{2}^{\circ}$ W.; AT ADEN, 3° W.)

Zanzibar and Pemba Islands, with the African coast opposite, have been described in the preceding chapter. Our knowledge of this coast is but small, but gradually increasing. The great rivers Zambesi, Rovuma, Lufji, and other minor ones, still require to be explored, and their deltas more accurately laid down upon our charts. **The Coast**, from Delgado to the equator, was formerly called Zanzibar, or Zungbar, but the name only properly applies to the island, though the coast also belongs to the Sultan of Zanzibar.

Mombas, or Mombasa Island, lies 16 leagues to the N. of Pemba, and is about 9 m. long from N. to S., and about $1\frac{1}{2}$ m. broad, nearly filling the large basin formed by the main land, and having a channel on each side leading to interior ports. The main entrance is about $1\frac{1}{2}$ m. wide between the outer reefs, which, together with the S. end of the island, form the outer bay or Road, which has in general from 6 to 9 fathoms water, with some deep holes of from 18 to 35 fathoms, and a shoal patch with less than 4 fathoms. This Road is convenient in the N.E. monsoon, the water being generally smooth, but in the S.W. monsoon a considerable swell sets in. The channel on the N.E. side of Mombas Island, which leads past the city, terminates in the harbour called Port Owen Tudor, at the head of which are entrances to several rivers. The W. channel does not continue round the N.W. end of the Island, but bending suddenly to W., opens into the larger harbour of Port Reitz.

The city, castle, and fort are on the N.E. side of the Island, where ships may procure refreshments: fresh water may be got from wells about a mile above the city, on the E. shore, and the anchorage is safe. Between the two reefs which form the entrance, the depths are from 6 to 10 fathoms, nearly the same to the city, and deepening afterwards along the E. side of Island; on the S. side of the Island, between it and the S. reef, the depths are rather greater, and this part may be called the Southern Harbour. Mombas Island is like a huge castle encircled by a moat, and the contiguous land is low and woody; a pillar on the E. end of Island, or the fort flag-staff, in lat. $4^{\circ} 4' S.$, lon. $39^{\circ} 43' E.$, may be perceived in passing, but the city is obscured by trees: there are three remarkable hummocks, to the N. of this place, by which it may be easily known.

Mombasa Port, although safe inside, is difficult of access, on account of extensive reefs which contract the entrance to about 2 cables, with from 8 to 16 fathoms between reefs. Run in with the castle bearing about N.N.W., and follow along the E. side of Island, rather under 1 cable length from it, up to the town, where anchorage may be taken in mid-channel in 10 or 12 fathoms. The natives are not always friendly to Europeans. Since the Arabs and natives expelled the Portuguese from ports on this part of the coast, few European vessels touch at any of them. Zanzibar is preferable to other ports, if a ship be in want of water or other refreshments: there is less chance of treachery, and being under the Sultan, and having English and French Consuls, it is more civilized.

Leven Reef runs parallel to the coast about 1 m. off shore, to N.N.E. of Mombas entrance; the channel, inshore of it, is navigable for small vessels.

Winds. During the N.E. monsoon, the sea breeze sets in daily at E. by N. in the forenoon, lasting fresh till sunset; afterwards hauling round to a light land-wind from N. by E., which is steadiest after sunrise till about 8 a.m., the best time for running out.

Tides. H. W. on F. and C. occurs at 4 h.; ordinary springs rise 12 ft.; high springs 14 ft.; neaps 8 or 9 ft. Ebb and flood run nearly equal times, at springs from 2 to 3 knots.

Quilife River, situated in lat. $3^{\circ} 38' S.$, lon. $39^{\circ} 59' E.$, is an excellent harbour inside. H.M.S. *Ariel* was piloted in by a native, and never got less than 8 fathoms. Pilots may be obtained

by sending to the town. Anchorage may be had in 10 fathoms, about 1 m. within the mouth; but you get the sea-breeze better if anchored just inside the entrance reefs; this is of importance for the health of the crew. Sheep, goats, and fowls may be had at a village on the N. side of the River entrance. **Owyombo River**, in lat. $8^{\circ} 24' S.$, appears large, but little is known about it.

Port Maleenda is formed by Leopard Reef on the outside, which is $2\frac{1}{2}$ m. off shore, and other reefs contiguous to the main, having depths of 4 to 8 and 9 fathoms. Leopard Reef (the S. end), in lat. $8^{\circ} 17' S.$, about 6 leagues E. by N. from Quilife River, extends about N. by E. and S. by W. $2\frac{1}{2}$ m. in length, having high breakers on the shoal parts. All the shore to the W. seems bounded by other reefs, nearly dry.

Vasco da Gama's Pillar, in lat. $3^{\circ} 13' S.$, lon. $40^{\circ} 11' E.$, is on the N. end of a flat peninsular rock, which serves as a pier for a small cove only fit for boats.

Formosa Bay, about 9 leagues in breadth, and 3 or 4 leagues deep, has soundings from 16 to 8 and 6 fathoms; the S.W. point, Ras Gomany, is in lat. $3^{\circ} S.$, lon. $40^{\circ} 19' E.$; and Ozy, the N. point, is in lat. $2^{\circ} 37' S.$, lon. $40^{\circ} 39' E.$, having the Ozy detached reefs fronting it, and extending 4 or 5 m. to the S.W., with depths of 14 and 16 fathoms near them. There are also reefs in the W. part of the Bay 4 to 5 m. off shore, in the stream of 8 fathoms. The Ozy River appears to have its source near Mount Kenia (18,000 ft. high), and nearly 40 leagues to the N. of Mount Kilima Njaro (20,000 ft. high). From Formosa Bay, the coast extends in a N.E. by E. direction, all rather low; and to the S. of Patta there is a chain of five islands covered with trees.

Lamoo Town and Castle, in lat. $2^{\circ} 16' S.$, lon. $40^{\circ} 56' E.$, are 10 leagues to N.E. of Ozy Reefs, and about $3\frac{1}{2}$ leagues to the S.W. of Patta, on the E. side of Lamoo Island, which is separated from Manda Island by an arm of the sea, forming a secure harbour for small vessels, although the entrance is intricate. Lamoo Bay, to the S.W. of Lamoo Island, has from 4 to 10 fathoms, with partial shelter during the N.E. monsoon. In the outer part of the Bay, about 2 m. S.S.W. of Kattow Point, the S. point of Manda Island, is a $2\frac{1}{2}$ -fathoms patch, called Kattow Knoll. The rocky islet of Kinyeka, stands about 7 m. to the S.W. of the entrance to Lamoo Bay. The channel into the river is narrow: a ship desirous of entering should sound it, and place boats or marks on the shoal points; no trustworthy pilot can be had.

PATTA, in lat. $2^{\circ} 9' S.$, lon. $41^{\circ} 2' E.$, is built on a mud flat, which is overflowed at H. W., having a boat-channel through it to the town. The bay is protected by extensive reefs, which stretch along shore at 2 and $2\frac{1}{2}$ leagues from land, having narrow passages between some of them. The middle passage has from 7 to 8 fathoms water in it, and was frequented by English ships formerly, when they traded to this place for cowries, ivory, &c. The Portuguese used the channel that lies 4 m. more to the W.; to the E. there is a winding channel with 3 fathoms water on the bar, said to be dangerous during the S.W. monsoon from April to the latter end of Aug.

Patta Bay is bounded on the N.E. by the reefs and sands of Seewy, on the S.W. by Manda Island, and to seaward by the Pesarly, Egava, and other reefs. The shores of the Bay are all very low, but the S.E. shore of Manda Island has sand-hills of moderate elevation, its E. point being a bluff headland, faced by a sand-flat which extends towards the W. rocks of Egava. Kizingaty Island, which lies 2 m. E.S.E. of the town of Patta, is 2 m. in length from E. to W., and its S. face has a barrier of rocks a little separated from the shore. Patta E. Cliffs, which are 2 m. farther to the E., also present a similar structure. Pesarly outer rocks have some heads which never cover with the tide; these rocks are very bold, and extend about $1\frac{1}{2}$ m. from N.E. to S.W. The Egava Reefs are two patches, which have some rocks always above water, and joined by a rocky ledge which is always covered. The N.E. Egava is 2 m. W. of the S.W. Pesarly Rock, and the S.W. Egava $2\frac{1}{2}$ m. farther and nearly in the same direction. Two m. S. by W. of the N. Egava is the outer reef of Patta, a patch of which dries towards L. W.; it is steep on all sides and having a deep channel, nearly $\frac{1}{2}$ m. wide, between it and the flats of Egava. The outer 4-fathoms' banks are more than half a league S. by E. and S.E. by S. from the outer Patta Rock.

Coming from the N. with the N.E. monsoon, Seewy Reef may be coasted in from 12 to 14 fathoms; not bringing Kwyhoo Peak to the E. of N.E. by N. until the W. extremity of Patta E. Cliffs opens to the S. of Seewy Reef. The Reef may then be coasted at a convenient distance and depth by the lead.

To avoid the N. middle patch of $3\frac{1}{2}$ fathoms, between Pesarly Ridge and Seewy Reef, pass to the E. of it, with the W. extreme of Patta E. Cliff bearing N.W.; the channel between it and the S.W. end of Seewy Sand is a clear $\frac{1}{2}$ m. wide. But many may prefer to sound on this middle patch towards H. W.; the passage between it and the N. Pesarly Rocks is well open; a ship may steer as she will and choose any berth in Patta Bay, taking care to avoid the $1\frac{1}{2}$ -fathom knoll; or steer for the E. cliffs of Kizingaty Island from any part of the pass or channel between Pesarly and Seewy Reefs, until the N. rocks of Egava are on with the sand-hills upon Manda Island,

bearing about S.W. by W. She may anchor anywhere between the flat which extends near $\frac{1}{2}$ m. to S. of Kizingaty Cliffs and the N. rocks of Egava. This part of Patta Bay is called Khor Egava.

A ship in the N.E. monsoon, entering Patta Bay by the channel S. of Pesarly Rocks, may coast that ledge as close as convenient; remembering that the rocks of Pesarly Ridge are covered at half-flood; and haul into the Bay, round their S. end, steering for the E. end of Kizingaty; she may pass over or on either side of the middle patch of $3\frac{1}{2}$ fathoms, which is about mid-way in this pass.

In the S.W. monsoon, a vessel sailing into Patta Bay, after rounding Ras Kattow, the S. part of Manda Island, may steer N.E. by N. for the outer reef of Patta, and coast that on either side as convenient; then steer for the Pesarly Rocks, until the town of Patta is bearing N.W. by N., when she may steer for the E. end of Kizingaty, and proceed as before directed. The soundings are 30 and 32 fathoms about 5 or 6 m. outside the reefs, and 9 or 10 fathoms close to them. Inside, near the inner edges, the general depths are from 5 to 7 fathoms, shoaling towards the Island. The proper anchorage is within the reefs, near Kizingaty Island, which lies to the E. of Patta, in lat. $2^{\circ} 8' S.$

Tides. It is H. W. at $4\frac{1}{2}$ hours on F. and C. of the moon; rise of tide 9 to 11 ft. Variation $8^{\circ} W.$

Kwyhoo Bay, or Road, is an anchorage at a large inlet about 3 or 4 leagues N.E. of Patta. The entrance of the inlet is about 5 m. wide between Seewy Point to the S.W. and the S. point of Kwyhoo Island to the N.E. The S. end of Kwyhoo Island projects to the S.W. in a long narrow point, having a ledge of rocks, and beyond the rocks lies Boteler Ledge, of dry rocks; Boteler Bank is 2 m. to the S. of the ledge. The entrance to Kwyhoo Bay is between Boteler's Bank and the N.E. end of the Seewy Reefs. The Bay has from 4 to 8 fathoms water. Kwyhoo Island is faced by high sand-hills, and near its S.W. end is a remarkable peak, upwards of 200 ft. above the sea. Kwyhoo Bay, in the S.W. monsoon, affords best anchorage under Seewy Reef, which lies about $2\frac{1}{2}$ m. E. from Seewy Point; but without chart or pilot ships in general should not try it; and the chart will be a better guide than most pilots to be had here. Kwyhoo Knoll, of 5 fathoms, lies E. $\frac{1}{2}$ S. of the Peak, 3 m. off shore; lat. of Peak $2^{\circ} 0' S.$, lon. $41^{\circ} 18' E.$

THE JUBA, or DUNDAS ISLANDS, are a chain of hundreds of islands and rocks, fronting the coast from Kwyhoo, nearly to the equator; the coast trending nearly straight, N.E. and S.W. They are generally narrow, having their length parallel with the shore, from which they are rarely distant more than $2\frac{1}{2}$ m., and may sometimes be mistaken for the main land; there are reefs stretching out from, and uniting many of the islands, with fine bays or harbours among them: but, in many parts near the edge of the bank, are coral spots of 3 fathoms. The outer edge of the bank of soundings is 4 and 5 m. from the shore, and steep-to; the depth decreasing from 20 to 13 fathoms at one cast in standing on it, when a ship should immediately tack.

Durnford Port and River are situated about the centre of that coast which is fronted by the Dundas Islands. The remarkable hilly peninsula of Boorgal is on the N.E. side; and between the ledge of rocks extending from the S. point (called Foott Point) of this peninsula, and Hood Ledge, which terminates the reefs lining the S.W. shore, is the entrance-channel to the port. It is about 3 cables wide, with 5 and 6 fathoms water, and the bar (which is $\frac{1}{2}$ m. further in, between two sand-heads) has $3\frac{1}{2}$ fathoms, at L. W. springs; and from 8 to 10 fathoms higher up towards the River. There are some habitations on the W. side, the largest village being 6 m. from the entrance.

The sand-heads on each side of the entrance dry at spring-tides; the E. sand-head lies about $\frac{1}{2}$ m. W. by N. from the S. point of Boorgal Peninsula, and the W. one about a mile from the same point in the same direction. There is a small island on the W. sand-bank, called Joyce Island, and on a point higher up some ruins, opposite which on the E. side is Deep-Water Point. About 2 m. higher up the river, on its W. shore, is Point Henderson, and off it Duncan Island. There is a 2-fathoms patch about $\frac{1}{2}$ m. inside the E. sand-head, which should be passed to the W. Ships may steer in between the entrance-ledges of rocks on a W.N.W. course, crossing the Bar in $3\frac{1}{2}$ fathoms L. W., until Point Henderson just touches Deep-Water-Point bearing nearly N.W. by N., which is the mark for clearing the patch; when the centre of Joyce Island is brought to bear W., keep in mid-channel.

Between Foott Point and the E. sand-head there is a very snug little anchorage and harbour in the N.E. monsoon, named Port Foott. The **Rozier Bank**, $1\frac{1}{2}$ m. in extent, S.W. and N.E., with 3 fathoms on it, off shore 2 m., lies 7 or 8 m. to S.W. of Port Durnford. Round the N.E. point of Boorgal is a deep bay, called Port Johnes, and described as a commodious harbour still in use by coasting craft; but a coral patch, of 2 fathoms, lies 1 m. to E. by S. from the

N.E. point of Boorgal Peninsula. The S. point (Point Foott) of Boorgal Peninsula is in lat. $1^{\circ} 13' S.$, lon. $41^{\circ} 54' E.$ H. W. at $4\frac{1}{2}$ hours on F. and C.; rise of tide 12 ft. Variation $8^{\circ} W.$ About 4 leagues N.E. of Durnford there is another river, between which and Toola Island there appears to be anchorage; and 4 leagues farther the River of Shamba, fronted by the long narrow island of Thoola, which shelters the anchorage.

Kiama Island, or Doubt Rock, is in centre of a pass, in lat. $0^{\circ} 40' S.$, lon. $42^{\circ} 20' E.$; at $2\frac{1}{2}$ m. more to the N.E. lies Kismayo Island, having on it three white patches; and within these islands and the others to the S.W. there is an inner passage for small vessels, having various soundings, from 7 to 2 fathoms sandy bottom. Kismayo Island has a village on the N.W. side, and near to its S. point, in lat. $0^{\circ} 40' S.$, there is a channel nearly a mile wide, with from 4 to 6 fathoms, leading to a spacious bay or harbour, where ships may anchor in 4 or 5 fathoms close to the S.W. part of that Island, or inside the rocky islets that project from the N. point of Kiama, and which bound the S. side of entrance. This anchorage appears to be the best for large vessels of any of the harbours to the N. of Port Durnford. About a mile S.E. from Doubt Rock is a corally bank of 2 and $2\frac{1}{2}$ fathoms.

Dædalus Shoal, consisting of several rocky patches, with 4 and 3 fathoms, in lat. $0^{\circ} 24' S.$, lon. $42^{\circ} 36' E.$, about $3\frac{1}{2}$ leagues S.S.W. from Juba River, and about 3 m. off shore, near some islands which form a bay within them. The Blanket Shoal lies W. by S. $1\frac{1}{2}$ m. from this shoal, with 2 to 4 fathoms on it. The coast hereabout is low, with sand-hills facing the sea in many places, and the surf runs high upon the shore, except where it is sheltered by islands or projecting headlands.

Govind, or Waveenda River is called Joob or Juba by Arabs, and by former navigators **Rogues River**, or **Rio dos Fuegos**; the entrance is situated in lat. $0^{\circ} 14' S.$, lon. $42^{\circ} 39' E.$ Juba Town is composed of a few huts, situated on an eminence about a mile inside the river's entrance, which has a bar on which the surf beats high. It is H. W. at $4\frac{1}{2}$ hours, on F. and C. of moon, and the tide rises 9 or 10 ft. Variation $7^{\circ} W.$ Boats may pass over the bar at H. W. during the fair season; but the perfidy of the natives should deter European ships from visiting this place. H.M. ships *Leopard* and *Dædalus* being very short of water, anchored here, expecting to procure a supply of this necessary article, or other refreshments; two boats upset in the surf, and although the natives at first appeared in a supplicating manner, they soon collected in numbers from behind sand-hills, assaulted with their spears the boat's crew, and killed Lieut. Mears with several of the men; the remainder of the crews were chased by the savages along the beach 8 or 9 m. to the S., where they were taken up after sunset, in a small bay, by one of the boats that followed them along the beach. It was off the three islands which form this small bay that the *Dædalus* struck on the coral shoal, after having run down to pick up the boat containing the men who escaped massacre. Whether this hostility still continues, we have not been able to learn; but, away from the influence of the Sultan of Zanzibar, the natives are not yet to be trusted. The coast, up to Ras Hafoon, is only known to us by the running survey of Admiral Owen, executed half a century ago.

Currents and Winds. In the latter part of Nov., Dec., Jan. and part of Feb. the currents set along this coast to the S.W., frequently 2 m. an hour, and the wind prevails generally fresh at E.S.E. by day, veering to E.N.E. and N.E. at night. Had Admiral Blanket's squadron stood out into the open ocean, they would have got out of the strong current, which runs along the coast in soundings, and have been able to beat up to the Red Sea against the monsoon. Between Zanzibar and the equator, the current in March began to set to the N.E.

"The East African Pilot," by Captain De Horsey, R.N., gives us the best notions about the currents of this coast. The S.W. current of the Indian N.E. monsoon, seldom goes below Port Durnford or the Juba Islands. But, from Dec. to March, this S. current meeting the N.E. current (which runs all the year round past Cape Delgado and to the N. past Zanzibar) an off-set E. current is produced, setting towards the Seychelles Islands; and it continues thence on this E. course because there assisted by the N.W. monsoon, which then prevails at those islands and the Chagos Archipelago. When the sun has crossed the equinoctial on its N. journey, the S.W. monsoon along this coast of Africa follows in about a month, and by end of April or beginning of May, the N.E. set will be fully established towards Socotra. In June, July and Aug., the rate of N.E. current along this shore has been registered at 4 knots an hour.

THE COAST. From the entrance of Juba or Govind River to Brava, the coast extends N.E. $\frac{1}{2}$ E., about 38 leagues. It is rather low and sandy, with a few little bays; a high surf beats against the shore; but soundings along it are more regular than on the coast of Zanzibar, and ships may approach in many places within 2 or 3 m. of shore. H.M.S. *Wasp* (1865) reports that a coral reef extends along the shore between Juba and Brava, at from $1\frac{1}{2}$ m. to 2 m. off shore, and it is steep-to.

Brava, in lat. $1^{\circ} 7' N.$, lon. $44^{\circ} 3' E.$, is a town close to the sea, belonging to Arabs, and seems well built; close to it lie several small islets or rocks, which break off the sea, and about a mile to the S. of the town, on a small peninsula, there is a pagoda or tower, resembling a lighthouse. Inside the outer islets, called Barette Rocks, the country boats lie sheltered in 3 to 24 fathoms water. Ships may anchor outside in 7 or 8 fathoms water, or in greater depth; but the road is exposed to a heavy swell, which rolls in with winds from seaward. The bank of soundings is distinctly marked by the colour of deep ocean blue, changing suddenly to green; and further towards land, as suddenly to dirty yellow. The tide rises 8 ft., and it is H. W. on F. and C. at 4 h. 30 m. Variation $6^{\circ} W.$ About 10 leagues to the S.W. of Brava, there are several high white sand-patches near the shore. From Brava the coast extends nearly E.N.E. about 34 leagues to Mukdeesha. Between them the coast is bold to approach, sterile, sandy, destitute of trees, with a few islands near it in some parts; but it abounds with cattle and goats, and has on it the towns of Torra, Mongooya, Marka, Jillip, Horealy, Denan and Gezerat; the latter is in lat. $1^{\circ} 58' N.$, lon. $45^{\circ} 7' E.$, and nearest to Mukdeesha.

MUKDEESHA, or MAGADOXA, in lat. $2^{\circ} 2' N.$, lon. $45^{\circ} 25' E.$, is the principal town on this part of the coast of Africa, easily known by 2 or 3 remarkable mosques or minarets, resembling towers, but which are tombs for the dead; there is also to the E. of the town a large copse of trees, but no river. A reef of coral rocks fronts the town, extending 3 or 4 m. to the E., within which is a narrow channel with 10 or 12 ft. water at low spring tides, and having a sandy beach inside, where landing is good; but, with fresh S. winds, the passage between the reefs will be dangerous for boats. The lead will obtain no ground at the distance of 3 or 4 m. from the shore. The inhabitants of these towns, like those of Juba, may not be much trusted yet by Europeans; formerly they were very treacherous. Fresh beef, good sheep and goats are plentiful and cheap. Most of the Arab dhows visit this place in their coast navigation to exchange sugar, molasses, dates, salt-fish, &c., for ivory, hides and gums.

Warshek Point is in lat. $2^{\circ} 30' N.$, lon. $46^{\circ} 7' E.$; to the N.E. of which a reef stretches fully a league S.S.W. from the rocky beach of the point next N.E. of Warshek; and to the S.W. the shore is skirted by rocky reefs for nearly 3 leagues. Upwards of 2 m. from shore lies the dangerous shoal of Warshek, inside of which the *Leven* passed in 1825, without seeing or having any indication of it until announced by the lead; but when clear of it breakers were seen; and it is supposed there must be less than 3 fathoms water on it, as the *Leven* passed over in 3½. Immediately to the W. of this shoal commences the **Warshek Reef**, which fronts the shore for 6 or 7 leagues at half a league off. The *Leven* coasted this reef from ¼ to ½ m. outside, sounding with upwards of 40 fathoms. The shores inside the reefs are rocky. From Mukdeesha to Ras Aswad is about 70 leagues, and the general direction of coast about N.E. ¼ E. Variation $5^{\circ} W.$ To the N. of Mukdeesha about 4 leagues, a chain of hills extends from thence several leagues farther in that direction; and there is a bay with white sand-hills, and a range of small islands, steep-to, near the shore. Farther to the E., there is another bay with white sand-hills, and a bank lines this coast, having on it very irregular soundings. A ship, in standing on the edge of this bank, should tack after getting soundings, for the depth decreases suddenly from 40 to 10 and 3 fathoms coral, in some places. The coast is in general a sandy soil, rather low and sterile. The prevailing winds in March are from S.E. and E.S.E., with a set to the S.W.; the current then changes, and sets afterward to the N.E.

Ternate Shoal, in lat. $9^{\circ} 15' N.$, projects about 2 or 3 m. from a point of low land, otherwise destitute of any distinguishing marks; soundings of 18 and 20 fathoms are near it, on the outside, and the sea breaking upon the shoal first points it out. Between Ternate Shoal and Ras Aswad, the coast is mostly low, with soundings close to shore. The entrance of the *doubtful* River Doara is supposed to be in about lat. $4^{\circ} N.$; but no river was seen when sailing near the coast.

Ras Aswad, or Black Point, in lat. $4^{\circ} 30' N.$, lon. $48^{\circ} 1' E.$, is a point of low black cliffs projected from sand-hills over the beach into the sea; it has low land near it to the S., but Ul Hberab, or the "mountainous country," lies to the N., seen in clear weather 9 or 10 leagues. The *Ternate* had soundings of 20 and 30 fathoms in coasting along near the shore in this part, but no additions have been made to our knowledge of it during half a century.

Ras Awath, in lat. $5^{\circ} 33' N.$, lon. $48^{\circ} 40' E.$, is about 24 leagues N.E. ¼ N. from Ras Aswad, and fronted by a reef; the coast forms a small concavity between these headlands, with soundings of 20 to 40 fathoms, 2 or 3 leagues off shore. Some hills extend from Ras Awath a little way to the N., and afterwards the coast (called by Arabs, *Sef Tweel*) becomes low, with sand-hills in some places, taking a direction about N.E. by N., with soundings within a few miles' distance, of 18 to 10 fathoms; and from 25 to 40 fathoms at 3 or 4 leagues off.

Ras-al-Khyile, or Moro Cobir Point, i. e. Serpent's Head, in lat. $7^{\circ} 43' N.$, lon. $49^{\circ} 45' E.$,

is formed of three distinct cliff points, and is the S. extreme of Negro Bay. The land to the S. is moderately high, but the coast to the N. of Ras-al-Khyle, called by the Arabs, *Hazine*, or "rough ground," is low and rocky to a great extent. From Ras Aswad to this place, the land is generally sterile, of an even appearance when seen at a considerable distance, but is little frequented by Europeans. The *Leven*, in hauling off shore for the night, struck soundings on a 6-fathom knoll when the N. point of Ras-al-Khyle bore about W.S.W. about 6 m. A close examination of the soundings near this point was not made; but it merits further attention, although the pilot was not aware of any danger on this part of the coast. Variation $3\frac{1}{4}^{\circ}$ W. near Ras-al-Khyle.

Ras Mabber, or Cape Stand-off, in lat. $9^{\circ} 29' N.$, lon. $50^{\circ} 50' E.$, is fronted by a reef, and the contiguous land is usually rather low. The name of the Cape indicates the practice of the Arab coasters bound to the N., who always run out from this point with the S.W. monsoon, in order to round Ras Hafoon, and avoid the dangerous intervening deep bay, a needful precaution. Ras Mabber has good anchorage in 6 fathoms on its N. side, the coasters frequently stopping there for water. Soundings do not extend far from shore.

Ras Hafoon, or The Surrounded, formerly called **Cape Orfui**, in lat. $10^{\circ} 27' N.$, lon. $51^{\circ} 22' E.$, is a peninsula from 400 to 600 ft. above the sea, joined to the main land by a low narrow isthmus of sand, shells and mud, which extends 3 leagues E. and W., forming a deep bay, with good anchorage on either side, according to the season. During the N.E. monsoon, the Arab coasters lie in the S. bay, where, wood, water (said to be bad) and refreshments may be procured. The peninsula, said to abound with cattle, sheep, camels and horses, is under the Mijjertheyn Somaui tribe, whose territory extends from Ras-al-Khyle round the N.E. point of Africa to Bunder Ziadeh. They are friendly to strangers, and may be trusted. The S. point of this promontory of Hafoon is high and flat like a barn, which appears at a distance separated from the Cape land.

Caution. Several ships have been embayed to the S. of the Cape in the night; one is said to have been lost and others had difficulty in beating out. Caution is therefore necessary in thick weather, or during the night. The best indication of a dangerous approach to land is the change in colour of the water on the bank of soundings. The prominence of this Cape also causes a marked alteration in the direction of the ocean swell when a ship is near it, in either N.E. or S.W. monsoon. The soundings about 3 m. off are from 40 to 50 fathoms. Variation $3^{\circ} W.$

Khor Hardeah. On the N. side of Ras Hafoon, is an extensive basin or harbour, about 20 m. in circumference, and 2 m. wide at its entrance, but it affords shelter for small vessels only, as there is but a depth of 1 to $1\frac{1}{4}$ fathoms inside. During the S.W. monsoon, every year, a fair is kept at Khor Hardeah by merchants coming from Makalleh on Arabian coast, and from the Mijjertheyn bunders or ports, who haul up their baghalahs on the beach, when they arrive at the end of May. A brisk trade is then carried on in gums, ostrich feathers, hides, ivory and ghee; much ambergris is also on sale, but at a high price. Elephant hunting is followed by those who have guns. Asses in great numbers are procurable for five or six dollars each. But Khor Hardeah is most unhealthy; its shores are covered with decomposed vegetable matter, which, if disturbed, gives out a sickening gas. Yet many fishermen live there, and become accustomed to it.

RAS ASIR, or AHSEER, called by mariners, **Cape Guardafui, or Assair**, the N.E. point of Africa, 900 ft. high, and about 28 leagues to N. of Ras Hafoon, is in lat. $11^{\circ} 51' N.$, lon. $51^{\circ} 16' E.$ The coast between them forms two large bays, separated by the bluff headland of Ras Ally Besh Quail, in lat. $11^{\circ} 9' N.$; on the N. side of which, in Gubet Banneh, a vessel might anchor in the S.W. monsoon, in 7 fathoms; off the village, and about $3\frac{1}{4}$ m. W.N.W. from the N. tip of the headland; there appears to be a plentiful supply of fresh water in these bays. Soundings of from 20 to 40 fathoms come within 2 leagues of the shore, between Capes Hafoon and Guardafui.

The headland of Ras Jered Hafoon, or Shenareef (10 m. S. of the N.E. Cape of Africa), is a mountain 2600 ft. high, rising from the water in four steps. To the W. and S.W. of Shenareef, the plateau of the African high land attains an elevation of 5000 ft., that may be seen a great distance. The bank of soundings for the deep-sea lead extends about 5 m. off Hafoon; 10 m. off Ally Besh Quail; and 15 m. to the E. of Ras Ahseer; but only 2 m. due N. of that Cape. There is good anchorage in the Bay to the N. and W. of the Cape, in from 8 to 10 fathoms, during the S.W. monsoon; but little will be gained by anchoring here. At Bunder Feelook, about 43 m. further to the W., plenty of fire-wood may be procured. The trade and inhabitants of this coast are described at page 120. Wahdy Tohum is a fertile valley, 7 m. to S. of Cape Guardafui, full of large mimosa trees, with a stream of water. The natives resort to it in great numbers, and will bring bullocks, sheep, and fire-wood to the Bay on the W. side of the Cape, but there is no anchorage off Wahdy Tohum. Excellent water might also be procured from the stream, but its carriage would be expensive.

SOCOTRA, THE BROTHERS, AND ABD-AL-KOORY.

SOCOTRA ISLAND, extending E. and W. 70 m., its greatest breadth 22 m., is generally composed of high mountainous land and granite peaks, which, abreast of Tamareed, are more than 4000 ft. high; seldom free from clouds. There is a low plain between the base of the mountains and the sea, varying in width from 2 to 4 m., excepting at Ras Felink and Ras Sharb, which rise up out of the sea. The S. side of the Island is arid and barren like Arabia, exposed to the force of the S.W. monsoon, which has blown up the sand into hills parallel with the beach, and in some places has spread it 9 m. inland till stopped by the mountain barrier. This plain on the S. side of the Island is called Nowkad, and affords pasture for flocks. The hills on the N. side of the Island have a thick and luxuriant vegetation. The plain about Tamareed has several beautiful fertile valleys, and oxen are numerous hereabouts. Vast flocks of sheep and goats are found all over the Island. These and the date groves furnish the principal means of support to the inhabitants, but they look also to imports of dates from Muskat.

Excepting a few of the headlands that have projecting reefs, the shores of the Island are bold to approach, with soundings at a considerable distance in some places. There are several anchoring-places, which may be used according to the prevailing monsoon; but none affording shelter at all times. The S. side of the Island, having few inhabitants or refreshments, and not good water, is not convenient for ships. The bays of Gollonseer and Sharb at the W. end of Socotra afford good shelter in the N.E. monsoon; and so does Bunder R'dresseh at the E. end of the Island. Tamareed Bay has a swell in the S.W. monsoon and violent gusts from the hills. But Deleeshi Bunder is best between June and Sept. Fikeh Bunder is good in the fine weather season, from Feb. to May; and is frequented in April for fresh water by trading boats from India. The Island has two wet seasons, June to Aug., and Nov. to Jan. During the S.W. monsoon, a vessel may find shelter from the sea in all bays on the N. side of the Island, to the E. of Ras Kadarma. These are Koormeh, Kathoob, Tamareed, Deleeshi, Gurrieh and Fikeh; but as the wind blows in violent gusts from the mountains, good ground-tackling is necessary; the anchorage being usually on a narrow bank of sand or rocky bottom, which has a steep declivity to the N., out of soundings. Of all these anchorages, Bunder Deleeshi is the only one which the natives call perfectly safe during the S.W. monsoon, and very smooth water.

Winds. The winds, most dangerous along the N. side of the Island, are expected between Nov. and Jan.; when, at the setting in of the N.E. monsoon, the squalls blow violently several days from N.N.E., with rain and a high sea, rendering it almost impossible for anchors to hold. Captain Haines experienced one of these N.E. gales so late as the 23rd Feb., 1834, while surveying on the S. coast. From Feb. to May is the fine-weather season, when the anchorages on the N. coast are considered safe. In June, July and Aug., the natives say the wind blows constantly in violent gusts from hills on the N. coast; while at the low belt of Nowkad, on the S. coast, the wind is more steady and less violent, with, however, a tremendous sea and surf. In these months rain falls in showers, but much less than that with the squalls of Nov., Dec. and Jan. In Sept., Oct., and part of Nov., light land and sea-breezes are experienced; late in Nov. the wind becomes gradually more settled from the N.

Tides. The tides are very irregular, sometimes running 16 hours in one direction, and at other times only 6 hours, depending much on the strength of winds and currents. The flood sets to the W. on the S. coast, and to the E. on the N. coast; and the ebb in opposite directions. H. W. on F. and C. between 7 h. and 8 h. on the S. coast, and about 8½ h. at Tamareed. Rise and fall from 6 to 8 ft. Currents around the Island are chiefly dependent on winds. Between the Arabian coast and Socotra, a W.S.W. current, of 40 m. per day, was experienced in Jan.; and in March an E. one of about 30 m.

Tamareed, or Hadeboo Bay, on the N. side of the island, where the chief resides, also called by the Arabs, Belád-al-Sultan, is 10 leagues distant from Ras R'dresseh, the E. Cape; it is the most eligible place for getting refreshments, Tamareed being the principal town, but the anchorage is indifferent. A point of sand shelters the E. anchorage, which is about 1 or 1½ m. off shore, in 10 to 13 fathoms sand and coral, with the town bearing S. or S. by W. On the N. coast, in coming from the E. towards Tamareed Bay, two white sand-hills may be perceived; the W. one is much the larger, and about 4 m. to the W. of it is the town, over which are high craggy granite peaks, from 3000 to 4000 ft. high, visible 7 leagues off. When the Bay is approached in the S.W. monsoon, the coast should be kept a-board from the E. end of the Island, as the wind blows in gusts off the high land. No ground is got with 100 fathoms line within 2 or 3 m. of the coast from the E. point of the island to Ras Howlaf; but to W. of that headland, and fronting the Bay,

the bank extends farther off shore, with gradual soundings from 5 to 20 fathoms. Bullocks, goats, sheep and fish may be procured here at reasonable prices, and good water, which runs from the mountains into a sandy valley among date-trees, about $\frac{1}{2}$ m. from the town, which is in lat. $12^{\circ} 39' N.$, lon. $54^{\circ} 0' E.$ The natives are poor, and hospitable to strangers: rice is an essential article to barter with them for refreshments. Good aloes may be procured; and at times, dragons' blood in small quantities; grapes, water-melons, pumpkins, oranges and plantains, may be got in March and April, and plenty of dates in June.

Ras Koormeh is about 3 leagues to the W. of Tamareed, and may be known by a few rising sand-hills near it: a reef projects off it about 300 yards, and along shore to Ras Tahal, about 2 m. to the E. The small bay and village of Kathoob are about $3\frac{1}{2}$ m. to the E. of Ras Koormeh, which bay is more sheltered from the S.W. monsoon than that of Tamareed.

Ras Kadarma, in lat. $12^{\circ} 42' N.$, lon. $53^{\circ} 38' E.$, bearing W. by N. $\frac{1}{2}$ N. 13 m., from Ras Koormeh, terminates in a low point from a bluff close to it, and thence the coast runs W. $\frac{1}{2}$ N. for $4\frac{1}{2}$ m. to Ras Bashuree, and 2 m. further W. to **Ras Samaree**, the most N. part of Socotra, where the mountains are nearly 2,000 ft. high, and almost perpendicular from the coast-line in some places, with a rocky beach. A pyramidal rock, nearly 150 ft. high is joined to Ras Bashuree by a narrow neck of land, about 50 yards in length. Soundings extend off Bashuree about $2\frac{1}{2}$ m. out from the coast; but towards Ras Kadarma not more than 1 m. off.

Ras Gollonsier, about 4 m. to W.S.W. of Ras Samaree, forming the E. point of Gollonsier Bay, may be known by four small granite peaks on it, and by the hills near them being in some places covered with sand. Between Ras Gollonsier and Ras Samaree the coast is fronted by a shoal extending a mile off shore, dry at L. W. in some parts, with patches of 2 fathoms near its edge, to which the soundings gradually decrease.

Gollonsier Bay, which affords anchorage in the N.E. monsoon, is formed by the bluff cape Ras Bedoo to the W., and Ras Gollonsier to the E. The village of Gollonsier, about a mile to the S. of the cape, is small, not containing 200 inhabitants, but has a plentiful supply of wood and water, sheep and goats: a few fowls, beans, and pumpkins also, but no bullocks. The Mosque is in lat. $12^{\circ} 41\frac{1}{2}' N.$, lon. $53^{\circ} 30' E.$ The best anchorage is in 4 fathoms L. W., with the N. granite peak on Ras Gollonsier N.E. by E.; the Mosque S.E. by E. $\frac{1}{2}$ E.; off the sandy beach or best landing-place 800 yards. A shoal spot of $2\frac{1}{2}$ fathoms lies nearly 2 m. to W. of the village. The soundings under 10 fathoms (which depth is not 1 m. from shore) are irregular with over-falls; and the fringing reef extends nearly 3 cable-lengths off shore.

Tides. H. W. at 7 h. 20 m. on F. and C. of moon; rise and fall 8 ft., and the flood sets to the E. This bay affords no shelter from the S.W. monsoon.

Ras Bedoo, in lat. $12^{\circ} 40' N.$, lon. $53^{\circ} 24' E.$, terminating in a bluff about 800 ft. high from the Jebel Marlee Mountains, forms the N.E. boundary of Gubet Sharb, a fine bay, with regular soundings and no danger beyond 2 cable-lengths from the shore. To the N. of Ras Bedoo, no soundings were got at the distance of a mile; but to the W. of it soundings of 20 to 34 fathoms extend several miles, rocky bottom, and good fishing-ground.

Saboynae Islet, in lat. $12^{\circ} 39\frac{1}{2}' N.$, lon. $53^{\circ} 11' E.$, bears from Ras Bedoo W. $\frac{1}{2}$ S. about 4 leagues; and from Ras Sharb N.W. by W. 9 m. It is a white granite islet, of considerable height, in extent about 800 by 150 yards, and may be seen more than 20 m., at which distance it resembles two ships under sail.

Sharb Bay, 7 m. in extent, between Ras Bedoo and Ras Sharb, has good shelter from the N.E. monsoon, though exposed to the S.W. Although generally smooth in the N.E. monsoon, strong gusts of wind sometimes blow from the high land, requiring great caution when under sail. The best anchorage is in 10 fathoms, about $\frac{3}{4}$ m. off shore, over a clear white sandy bottom, with the points of the bay N. $\frac{1}{2}$ E. and S.W. by W. $\frac{1}{2}$ W., and the **Ears Peaks**, S.W. by S., off some mangrove-trees, close to which is a lagoon of salt water, rising and falling with the tide, although separated from the sea by a bank of sand 400 yards in breadth. The village of Marthain Gibboose, where some good water is obtained from wells, consists of a few huts only, and the whole Bay has about 150 persons, who live in caverns; they are very poor, subsisting by their flocks and fish.

RAS SHARB, the W. cape of Socotra, in lat. $12^{\circ} 33' N.$, lon. $53^{\circ} 19' E.$, is a bold cape, the end of a mountain called Jebel Sharb; on which, at 3 m. to the E. from the cape, stand two remarkable peaks like **Ears**, which are 1480 ft. above sea. A reef extends from the cape about 300 yards. A depth of 14 fathoms is found at $\frac{1}{2}$ m. off, and no bottom at 4 m.

The coast from hence extends S.E. $18\frac{1}{2}$ m. to Ras Katahnee. The soundings along this part are usually sand and rocks, without danger; but about a mile from it, a $6\frac{1}{2}$ -fathoms bank lies parallel to the shore; this is not above $\frac{1}{2}$ m. in breadth, having 8 and 9 fathoms inside of it, and the same depths outside, increasing to 17 fathoms about 3 m. off shore. This part of the coast

affords shelter from N.E. and N. winds; and anchorage inside the narrow bank, in a little bay at the sand-hill, called Gubet Ney, or Bunder Ney, with 4 fathoms water close to shore, at the N. end of the rocky cliffs, where there is a small village, about 6 m. from Ras Katahnee.

Tides. The ebb tide along this side of the island runs S.E. 1 m. per hour; rise and fall 7 ft. on the springs; H. W. at 7 hours on F. and C. of moon, very irregular.

Ras Katahnee, in lat. $12^{\circ} 22' N.$, lon. $53^{\circ} 33' E.$, is a bold, bluff headland, 1455 ft. above sea, and has the same aspect from E. or W. A chain of mountains, called Jebel Kueireh, nearly of equal height, extends from it 5 m. to the E., and continues nearly to the E. end of the island, excepting a few passes, by which the inhabitants go to Tamareed. This chain in most parts rises like a wall from the low land, between its base and the sea, which belt is from 2 to 4 m. broad, and called Nowkad by the natives. This low land affords good pasturage for numerous sheep and goats; but the people were found very timid, always retreating with their flocks to the mountains, when wished to be communicated with. But, having a native of the island on board, the surveyors effected a conference, and a good supply of sheep and milk was obtained from these harmless people.

The S. coast between Ras Katahnee and Ras Felink is bold to approach, with soundings of 12 to 30 fathoms, extending from 4 to 6 m. off. Several reservoirs receive the drainage from the mountains, the water obtained by digging wells being brackish. One of these reservoirs at Wadi Felink, 3 leagues to the W. of Ras Felink, where the sandy beach terminates in rocky cliffs facing the sea, is supplied by a fine stream of fresh water running through the low land, the basin being separated from the sea by a bank of shingle. Here, during the fair season, Feb. to April, a ship might easily procure fresh water, by anchoring in 7 fathoms; also sheep, if caution is taken in communicating with the inhabitants; otherwise they will retreat to the hills.

Ras Felink, about 54 m. to the E. of Ras Katahnee, and about 6 m. W.S.W. of Ras R'dresseh, forms in a bluff cape, when viewed from the S.W.; but on a near approach, a low point is perceived to project from it nearly a mile, off which a reef extends to the S.E. about 400 yards, between which and Ras R'dresseh the coast forms a bay, with regular soundings, decreasing gradually to the shore.

Bunder R'dresseh is an anchorage formed to the S.W. of that cape, where a vessel might anchor in 9 fathoms sand and rocks, in tolerably smooth water, during the N.E. monsoon, with the outer small patch of rocks off R'dresseh, bearing E. by S.; the low point N.E. $\frac{1}{2}$ E.; and the high bluff of Mom, W. $\frac{1}{2}$ N. The channel between the detached reef and that projecting from the point has depths of 7 to 9 fathoms, but being less than $\frac{1}{2}$ m. wide, with rapid currents or tides, causing strong ripples, it would be imprudent to pass through it, except with a strong leading wind, as there is no ground at 90 fathoms to the N.E. of this intricate channel at the distance of $\frac{1}{2}$ m. from the shore of R'dresseh.

RAS R'DRESSEH, in lat. $12^{\circ} 34\frac{1}{2}' N.$, lon. $54^{\circ} 31' E.$, is the low E. cape of Socotra, forming in two small rocky points, which are nearly a mile distant, bearing N. and S. of each other. A reef projects $\frac{1}{2}$ m. from both, and at the distance of 1 m. to the N.E. you have more than 80 fathoms water, so the lead is not a guide in approaching the island from the E., the N.E., and the N. About a mile S.E. of the cape is a detached shoal, some of the rocks of which are above water.

Ras Mom (Socotran), or Ras Mutlar (Arabic), Cape E., in lat. $12^{\circ} 34' N.$, lon. $54^{\circ} 27' E.$, is a remarkable bluff mountain, 1920 ft. high, sometimes from its form called the Dolphin's Nose. It terminates the high chain that extends the whole length of the island, and is seen in clear weather at a considerable distance, when the low extreme of Ras R'dresseh, about 4 m. farther E., is not visible.

Bunder Fikeh, about $2\frac{1}{2}$ m. to the W. of Ras R'dresseh, and under the lofty bluff of Ras Mom, is a bay formed on the W. side of a small sandy point from which a reef projects 1 m. This place forms a small anchorage, protected by the reef from E. winds; where the small vessels from Cutch, or other places, stop to procure water in April and May on their pilgrimage to Jiddah. Water is got from a well near the village, or from a spring which issues between the two E. sand-hills. The best anchorage is with Mom Bluff W.S.W.; the outer break of the reef N.E.; Ras Dome W. by N. $\frac{1}{2}$ N. in about 12 fathoms. In approaching this anchorage caution is requisite, for the sea does not show the reef by breaking upon it, unless with a strong wind or heavy swell, and close to it there are 5 fathoms water, but 400 yards off no bottom at 60 fathoms. The village is small, with about 50 or 60 poor, timid and inoffensive inhabitants, living in huts, or in excavations.

Ras Dome, W. by N. $\frac{1}{2}$ N., 10 m. from the E. point of Socotra, is a sharp projecting cape, about 250 ft. high. To the E. scarcely a shrub is seen, except at the sand-hills mentioned as a

watering-place, where there are a few trees; but to the W. of Ras Dome, both the hills and valleys appear verdant, interspersed with small villages, of 20 or 30 inhabitants, who live on their flocks and fish, and supply good sheep or bullocks at a fair price. **Ras Hamadara** bears W. by N. $\frac{1}{2}$ N., distant $7\frac{1}{2}$ m. from Ras Dome, between which are the three date-groves of Thureh, Clayf and Tamereh, with a fine fresh-water pool near Clayf.

The Coast, from Ras Dome to Ras Dehamree, trending W. by N. 10 m., is low near the sea, with little rocky capes and sandy bays. The high land stands about 2 m. back from the beach, and is more than 1000 ft. high. The bank of soundings project only from $\frac{1}{2}$ m. to $\frac{3}{4}$ m. from it. Off Ras Hamadara, there is a rocky shoal nearly dry; with a narrow channel of 5 to 7 fathoms between it and the shore-reef that projects 300 yards from the point.

Bunder Gurrieh is a small bay on the E. of Ras Dehamree, where a vessel might anchor in 6 to 10 fathoms water, sand and rocks, from $\frac{1}{2}$ to $\frac{3}{4}$ m. off shore, with the extreme point of the cape bearing N.W. by N., or N.N.W., where she would be well sheltered from the S.W. monsoon. Inland there is a fresh-water stream, with numerous date-trees growing on its banks.

Ras Dehamree, a narrow, low, projecting neck of land, is 6 m. E.S.E. from Ras Howlaff. On it are two remarkable hillocks, the N. one about 130 ft. high. On each side of this cape there is a small anchoring-place; that of Bunder Gurrieh, already mentioned; and the W. one, called Bunder Debenec. No soundings with 280 fathoms line were got $\frac{1}{2}$ m. N. from Ras Dehamree, nor is any obtained until within a few hundred yards of it. Close to the extreme point there is a rock, and a rocky spit of $2\frac{1}{2}$ fathoms projects from a small rocky point to the S.W. of the former. A small vessel might anchor to the S.W. of the same spit in 3 or $3\frac{1}{2}$ fathoms, close in shore, with the point bearing E.N.E.; but the bottom is coral rock.

Bunder Deleeshi is formed between Ras Dehamree and a small point near Ras Howlaff, on which stands a little ruined mosque or tomb. Soundings extend across this bay a considerable distance from shore, which is safe to approach, and affords the best sheltered anchorage on the coast of Socotra during the S.W. monsoon. In the centre of the bay there is a sand-hill, with a creek $\frac{1}{2}$ m. to the W., called Khor Deleeshi, salt and shoal at the entrance, but a fine fresh-water stream inland, with date-trees on its banks. The sand-hill, bearing S. or S. by E., is a good mark for the best anchorage, in 7, 8, or 9 fathoms water, from $\frac{1}{2}$ m. to $\frac{3}{4}$ m. off shore.

Ras Howlaff, before mentioned in describing Tamareed Bay, is nearly 3 m. W.N.W. of the above ruined mosque, and bears from the mosque of Tamareed N.E. by E. nearly 5 m. It is a low projecting cape, rising towards the interior, and forming undulating sand-hillocks, covered with prickly bush: fronting the sea, it has small rocky points, with intervening sand beaches. The anchorage on the W. side of Ras Howlaff is preferable to Tamareed Bay; yet with the wind at E.N.E. a considerable swell rolled in, but not so much as abreast of the town, where there was a breaking sea at the same time: neither was landing so difficult as in other parts of Tamareed Bay.

THE BROTHERS are two islands to S.W. of Socotra, and on the same plateau of soundings. Depths of 15 to 20 fathoms are found to E. of these islands for more than 30 m., but this part was not thoroughly examined. The channel between the Brothers has soundings ranging from 20 to 25 fathoms.

Jezirat Derzee, the E. Brother, is about 3 m. in length E. and W., with an even table top, 970 ft. above sea. Its E. end is 27 m. S. of Ras Sharb, the W. point of Socotra. On its N. side there are soundings of 13 fathoms about 1 m. off, but it is steep to on other sides. The bank of soundings extends about 13 m. to the S.

Jezirat Sumheh, or the W. Brother, 9 m. W. by N. of Derzee, is $6\frac{1}{4}$ m. long, E. and W., and less than half that breadth. The E. end is broad, but the W. end narrows to a sharp point, off which a reef extends $\frac{1}{2}$ m. The island is high, and tabular for half its length. The highest part, near the centre and about a mile from the S. shore, is 2440 ft. above the sea. Off the S.E. side, are two small rocky islets. A reef projects $\frac{1}{2}$ m. from the N.E. side; off which, about $1\frac{1}{2}$ m., there is a small bank with 13 fathoms; between the latter and the reef 22 fathoms is found. The bank of soundings extends 15 m. to S. of Sumheh, and 25 m. to W.S.W.; but, midway between it and Abd-al-Koory, the depth is over 100 fathoms.

ABD-AL-KOORY ISLAND, midway between the W. end of Socotra and Cape Guardafui, is a high rugged island, $6\frac{1}{4}$ leagues in extent E. and W., but narrow, with a hill 1670 ft. high near the centre, and another on the E. part of the Island, 1500 ft. high. The W. half is not so elevated, only 500 ft.; and to the W. of the central peak the island is quite low, appearing from a distance like two islands. It is inhabited by people miserably poor, having little food and indifferent water. Admiral Owen anchored in H.M.S. *Leven*, in a fine bay, with a coral bottom, directly at the W. point of the high mountain on the S. side; but this place affords no refreshments for ships, although above sixty persons contrived to exist upon its barren soil.

Ras Anjireh, the N.E. point of the island, in lat. $12^{\circ} 11' N.$, and lon. $52^{\circ} 22' E.$, is rocky, with a sand-hill. An extensive shoal, having from 3 to 12 fathoms, called Bacchus Bank, extends from the N.E. point in that direction for $\frac{1}{2}$ m.

Ras Khaisat-en-Naum, the W. extreme of Abd-ul-Koory, is in lat. $12^{\circ} 14' N.$, and lon. $52^{\circ} 3' E.$ Soundings off this end are very deep, 25 fathoms at 1 m. off, 40 fathoms at 2 m. off; then over 100 fathoms: but a bank with 24 fathoms is found 8 or 9 m. W.N.W. of this cape.

KAL-FAROON, or Salt's White Rocks, lat. $12^{\circ} 26' N.$, and lon. $52^{\circ} 8' E.$, are two rocks, standing up out of the sea. They occupy a space about 7 cables long, N.E. and S.W., and 2 cables broad. Each has a lofty peak, 280 ft. high, and one or two hills of less height. They are covered with guano and look very white; birds in great numbers resort here. By day they are visible 15 or 20 m.; but at night are difficult to distinguish. They are 12 m. N.N.E. of the W. end of Abd-al-Koory, and situated on the N. side of a large bank of soundings with 10 to 20 fathoms.

Tides. H. W. here at 8 h.; rise of tide 6 to 8 ft. on F. and C. of moon. Flood sets to N., and ebb to S., from $1\frac{1}{2}$ to $2\frac{1}{2}$ knots per hour, between all the islands. Variation $2\frac{1}{2}^{\circ} W.$

CAPE GUARDAFUI TO STRAITS OF BAB-EL-MANDEB.

(VARIATION AT GUARDAFUI, $3^{\circ} W.$; AT PERIM ISLAND, $4\frac{1}{2}^{\circ} W.$)

From **Ras Ahseer**, or Cape Guardafui, (see page 108) the coast extends 10 leagues W.N.W. to Ras Ullooleh. In the bay, to the W. of the former cape, will be found good anchorage in S. winds, but farther W. the bottom appears rocky and the soundings irregular. At Moyah Boosah, 6 m. to the E. of Ras Ullooleh, there are wells of good water. Mountains, 1300 to 1600 ft. high, border the sea, except in one or two sandy bays.

Ras Ullooleh, or **Alooleh**, in lat. $12^{\circ} N.$, lon. $50^{\circ} 46' E.$, is very low, with a narrow entrance near its extreme to a lagoon of considerable extent, called Khor Gulwainee, into which a river falls. There is a village, Bunder Ullooleh, on the W. side of the lagoon, where cattle and an abundance of fire-wood may be procured. The water at this place is bad.

Ras Feelook, **Ras-al-Feel**, or **Cape Felix**, in lat. $11^{\circ} 57\frac{1}{2}' N.$, and 8 m. W. by S. from Ras Ullooleh, is a hill 800 ft. high, shaped like an elephant; it projects far into the sea, and the circumjacent land being low, gives it the appearance of an island. It may be seen at 15 leagues' distance in clear weather, and there is very deep water within a $\frac{1}{2}$ m. of it. There is a deep bay on the W. side of Ras Feelook. At **Bunder Feelook**, a small village with a fort, 10 m. S.S.W. of the Cape, there is good anchorage in 7 or 8 fathoms; and fire-wood may be obtained in any quantity. Ras Feelook is generally called by natives, Ras Belmook.

Bunder Marayeh is the principal town on this part of the coast, and is situated 8 m. to the S. of Bunder Feelook, in lat. $11^{\circ} 43' N.$; it has five forts, and affords an abundant supply of cattle, water and fire-wood. The natives at all these towns are civil and friendly to strangers.

Ras Goree, or **Cape St. Peter**, is in lat. $11^{\circ} 30' N.$, lon. $49^{\circ} 44' E.$, and 20 leagues W.S.W. of Ras Feelook. It is the termination of a ridge of lofty mountains 4600 ft. above the sea. There is a fort and village on its W. side, and about 12 m. to the E. is **Bunder Khor**, where a river, carrying salt water 5 m. inland, falls into the sea. It is navigable for small boats as far as the town, about 4 m. There is a fort on the W. side of the entrance. Soundings extend off the coast hereabouts from $1\frac{1}{2}$ to 3 m. About 7 m. W. of Ras Goree is **Ras Antareh**, a high rocky cape, forming the foot of the lofty mountain, Jebel Antareh, 5000 ft. above the sea. The soundings deepen rapidly from the Cape. From Ras Antareh the coast trends W. by S. $\frac{1}{4}$ S., 36 m. to Bunder Ziadeh, the W. limit of the Mijjertheyn, and the E. limit of the Wursoongli Somaui tribes. Bunder Ghazim is 12 m. to the E. of Ziadeh.

Ras Hadahdeh, bearing W. by N. 20 m. from Ziadeh, is a rocky cape 300 ft. high. From it the low sandy point of **Ras Gahm** bears W. 18 m. From Ras Gahm the coast trends W. by S. 27 m. to Ras Gulwainee. From Ziadeh to Meyt, the limestone mountain range, Jebel Wursoongli, 6,500 to 7,000 ft. high, backs the coast at a distance of 10 to 15 m. There are several towns along the coast, at all of which water, fire-wood, and cattle are to be procured. **Ras Gulwainee**, in lat. $11^{\circ} 8' N.$, lon. $48^{\circ} 1' E.$, is in a bight of the coast between Ras Gahm and Ras Suereh, which capes are 50 m. apart. Soundings extend off the coast from 2 to 4 m.

Ras Suereh, a low bluff point, is 50 m. W. of Ras Gahm; along this coast, undulating hills intervene between the lofty mountain range and the sea. Bunder Jedeed, about 6 m. W. of Suereh Cape, is the W. boundary of the Wursoongli Somaui tribe, who are said to be not always civil to strangers.

MEYT, or BURNT ISLAND, called also Bird Island, Ais or White Island, in lat. $11^{\circ} 13' N.$, lon. $47^{\circ} 16' E.$, is a high barren rock 430 ft. high, of white aspect, being covered with birds' dung. It is 16 m. W. by N. from Ras Suereh, and 6 m. off the nearest shore. The coast is moderately elevated, with soundings near it, and the channel between Meyt and the main is $5\frac{1}{2}$ m. wide, free from danger, with depths of 13 to 32 fathoms. The edge of soundings extends 8 m. to the N. and W. On the S. side of the Island there was found a remarkable cove, or natural dock, sufficiently large to admit a ship of 300 tons in security, by clenching the ends of a cable through holes of the rock; the remains of two clenches of cables were affixed to the rock in 1801; and part of a hemp cable was found in 1844. There appears to be no danger near the Island, except at the W. point, where a reef projects out about a cable's length, with a sunken rock, having over it only 12 ft. water.—(See SAILING DIRECTIONS, pages 117 and 122.)

E. Ras Kateeb, a low rocky cape, bears S.S.W. $\frac{1}{2}$ W., 11 m. from Burnt Island; and, at 7 m. further to S.W. is a rocky point at the foot of Jebel Meyt, a hill 1,200 ft. high; the tomb and town of Meyt lie 2 m. to the E. of this hill. The lofty range of mountains, Jebel Wursoongli (6,000 to 7,000 ft.), standing from 5 to 7 leagues from the sea-coast between Ras Antareh and Meyt, terminate in Pyramid Peak (6,170 ft.), about 5 leagues to the S. of Meyt tomb.

Meyt Tomb lies S.W. by S. 17 m. from Burnt Island, and soundings off it are very deep, within a mile of the shore 70 fathoms. Between it and Ras Ankor (Ungar) about 18 leagues, a deep bay is formed, called Gubet Rakoodah; here the soundings extend off shore about 2 m.: Sugar-loaf Hill, 990 ft. high, is in lat. $10^{\circ} 40' N.$, lon. $46^{\circ} 16' E.$, and 6 m. to S. of Ras Ankor. Ankor (Ungar) Peak, 3,700 ft. above sea, stands 7 m. further to the S. From Ankor, the coast goes W. by N. to **Ras Khanzir**, 24 m., in lat. $10^{\circ} 52' N.$, 3 m. to S.W. of which is Karram. The coast then trends W.S.W. 32 m. to **W. Ras Kateeb**, a sandy point, $4\frac{1}{2}$ m. to N. of Seyareh Peak; and 24 m. further to W.S.W. is Berberah. The hills 2 leagues at the back of Ras Khanzir are nearly 1,800 ft. high; and, at 5 leagues to the E. of Berberah, they are 2,600 ft. above sea.

Seyareh, a small village, 2 leagues to S.W. of W. Ras Kateeb, need only be noticed as the place whence, in the fair season, the wealthy Berberah merchants obtain a supply of good water.

BERBEREH, in lat. $10^{\circ} 26' N.$, lon. $45^{\circ} 14' E.$, or 47 leagues due S. of Aden Back Bay, is situated on a low sandy shore, which extends to the W. and N.W. as far as Zeyla, backed by a range of mountains. The small port or bay is formed by a hook of sand projecting to the W. a little more than a mile, affording shelter in from 6 to 9 fathoms. This place, although little known to Europeans, is frequented by trading vessels from the coast of Arabia and adjacent parts; but the natives ought not to be trusted. The English brig *Marianne*, belonging to Mauritius, was attacked by some of the Somaali tribes in 1825, when several of her crew were murdered, and the vessel plundered and burnt. The captain, mate, and other survivors escaped to trading dows which were at anchor near them, were carried to Mocha, and from thence to Madras. In 1855 Burton, Speke and Herne of the Indian Army, and Stroyan of the Indian Navy, were treacherously attacked in the night; all were severely wounded, the latter was killed. Since that sad event, the chiefs of adjacent tribes have been bound under a penalty to prevent such deeds. Caravans pass between this port and the interior of Abyssinia.

Berberah Town is at the E. end or head of the harbour, and varies in dimensions and population with the season of the year. From Oct. to March, the trading season, the population amounts to 10,000 or 15,000 souls. The tribes from the interior begin assembling in Oct., and are continually arriving with caravans up to March, bringing their produce; ghee, ivory, myrrh, gums, coffee, cotton, &c. These things they exchange for cotton cloths, piece goods, shawls, copper-wire, zinc, &c. Trade is entirely in the hands of banyan merchants, who enter into agreements with the tribes for the following year's produce, for which their baghalah's or kotieh's will be ready in harbour as soon as it arrives. At the end of March the town and harbour are being deserted, the natives leave for the mountains, trading vessels have all departed by the first week of April, and nothing remains but the frame-works of houses piled on the sandy shore ready for next year, and bones of camels and sheep, which soon attract various beasts of prey. Lions are often seen at the town wells during hot weather.

The great drawback to Berberah as a port, is the lack of good drinking water; the wealthy merchants obtain their supply from Seyareh. Nor is Berberah readily made out from a distance; between April and Sept. there are no vessels there to mark the place; but, in the fair season, the numerous masts are visible over the low sandy point that forms the harbour.

Tides. H. W. on F. and C., at 7 h. 15 m.; rise and fall about 9 ft.

The Coast from Berberah extends to the W. for about 13 leagues, or till near Jebel Elmas, which is 2,000 ft. high, within 7 m. of the shore; it then takes a N.W. direction for 25 leagues to Zeyla. From Berberah to Karagarit, it has not been thoroughly examined.

Shab Karangarit, the first (known) dangerous reef to N.W. by W. of Berberah (from which it is distant 27 leagues), lies 2 m. off shore, in lat. $10^{\circ} 57' N.$, lon. $43^{\circ} 49' E.$; it bears E.S.E. nearly 2 leagues from the small boat harbour of Khor Karangarit. Above this place the coast is fronted by shoals at the distance of 2 to 10 m. from shore, the soundings outside of which appear to increase regularly from 7 or 8 fathoms to 20 and upwards, as far as sounded. Variation $4\frac{1}{2}^{\circ} W.$

ZEYLA, in lat. $11^{\circ} 22' N.$, lon. $43^{\circ} 30' E.$, a town of some importance, having a trade with Mocha and neighbouring parts, is situated on a low sandy point, between which and Saduldeen Island ($3\frac{1}{2}$ m. to N. of it) is the anchorage in 3 and 4 fathoms. To the N. of Saduldeen, $2\frac{1}{2}$ m., is another island, called Ivát or Erbaat; but these appear so surrounded with banks and shoals as to render navigation into Zeyla Bay very difficult. Anchorage for large ships at Zeyla is about 3 m. N.N.E. of the town and to the S.E. of Saduldeen Island, in $4\frac{1}{2}$ or 5 fathoms water. The rocky shoals of Sháb Filfil lie nearly 8 leagues to N.E. and E.N.E. of Zeyla Mosque. By night an entrance should not be attempted. On a clear day the reefs are visible from aloft. Approaching from the S., a vessel should not shoal under 20 fathoms, until the mosque bears S.W. $\frac{1}{2}$ S. The soundings here extend from the coast 4 to 5 leagues.

The Coast from Zeyla trends N.W. 25 m. to **Ras Jibooty**. This point and Ras-al-Beer form the entrance to a wide and deep inlet, which runs in a W. direction to the meridian of $42^{\circ} 33' E.$, gradually narrowing till it terminates in a very narrow opening to an extensive basin, called Gubet Kharab, having a depth of 105 fathoms in its centre: this basin appears to be surrounded by steep rocky cliffs. The entrance to the basin is 27 m. W. of Ras Jibooty, and the interval of coast between them formed of steep cliffs, except near Jibooty, where the shore is low and swampy. From Jibooty N.E. by N. 7 m. in the direction of Ras-al-Beer, is a small group called the Mushah Islands; they stand on the N. edge of Zeyla Bank, and divide the entrance of the Gulf of Tajoura into two channels, the one to N. of the islands being free from danger, and the water deep.

Mushah Islands, ceded to England by the Sultan of Tejooreh in 1840, stand about 7 m. to N.E. by N. of Ras Jibooty. They are surrounded by coral reefs, and dangerous to approach.

Tajoura, or **Tejooreh Town** stands on the N. shore of the inlet, in lat. $11^{\circ} 46' N.$, lon. $42^{\circ} 52' E.$; from whence the coast runs E.N.E. 32 m. to Ras-al-Beer. Tejooreh Harbour, merely a gap in the shore-reef, with 10 fathoms, but with swinging room for one vessel only, is (like Obokh) exposed to S.W. winds. It is under the Chief of the Danarkli tribe, who is called Sultan. (See page 125.)

Obokh, the French settlement, in lat. $11^{\circ} 58' N.$, lon. $43^{\circ} 14' E.$, is 2 or 3 leagues to the W. of Ras-al-Beer, and between reefs, which extend nearly half a league from shore. Anchorage is in a gap with a depth of 15 fathoms, at $\frac{1}{2}$ m. from the main land; protected from all winds except S.W., which come sometimes in gusts from the Gulf of Tejooreh, between May and Sept. Tejooreh, Ambáboo and Obokh are the only villages along the coast between Goubet Kharab and the Red Sea entrance. Scattered parties of the Danarkli tribe may sometimes be found, but they have no permanent villages; when pasture is scarce in the interior, they drive their flocks to the coast.

Ras-al-Beer is a low sandy point in lat. $11^{\circ} 57\frac{1}{2}' N.$, lon. $43^{\circ} 22\frac{1}{2}' E.$, from which the coast runs N. for 6 leagues to Jebel Jarn table-land; whence it runs N. by W. about $13\frac{1}{2}$ m. to Ras Sejern, the S.W. entrance-point to the Red Sea. Off this cape, about E. by S., lies the group called Jeziret Sabah, or the Brothers; the outermost island being 7 m. from the cape. The shore between Jebel Jarn and Ras Sejern is low but backed by hills, the soundings off it are regular.

THE COASTS OF AFRICA AND ARABIA TO ADEN. Ras-al-Beer is 40 m. due S. from Perim Light; the cape is low and sandy, difficult to distinguish at night; said to be deep-to, but not yet thoroughly sounded. High land stands back about 7 m. from the sea, mangrove bushes and brushwood on sand-hills occupy the intervening plain. Above Ras-al-Beer, the same low sandy coast stretches to the N. for 5 leagues; then high table-land cliffs for nearly 2 leagues off Jebel Jarn; above that about 4 leagues of low shingly and sandy shore to Ras Sejern. The N.E., the highest island of the Brothers group, stands $7\frac{1}{2}$ m. due E. of Sejern Cape, and $9\frac{1}{2}$ m. to the S. of Perim Island. Amongst the Brothers, the tides are rapid and irregular, affected by the prevailing winds and currents. (See **The Brothers**, at page 127, in Chapter 8.)

Ras Ahrar Shoals, about $3\frac{1}{2}$ m. off the S. point of Arabia, are 35 m. to the E. of the Brothers. A dangerous sand-bank lies 22 m. E. by N. from Ahrar shoals, and 4 m. off the shore near Ras Kau; this sand-bank is 35 m. W. by S. of Aden.

SOUNDINGS IN GULF OF ADEN. Wherever the land is high close to the sea, the soundings are deepest; while the contrary is the case where the land is low and continues low for some distance inland. As a rule, then, the sea is shallow where the coast is low: and deep off high land. But the soundings off Ras-al-Beer show exception to this rule; off that cape, 30 fathoms is not found when a vessel approaches within $\frac{1}{2}$ m., but this coast needs further examination. Both

shores of the Gulf of Tejooreh are very deep-to, affording no anchorage. The **Zeyla Bank** of soundings, which begins from the Musháh islands on the N., and goes to as great a distance to the S. of Zeyla, extends more than 12 m. off the main; the depths increase gradually from the shore to 20 and 25 fathoms, muddy bottom; then comes a narrow ridge with 15 to 18 fathoms, close outside which no ground is obtainable at 40 and 50 fathoms.

Gubet Kharab, the deep basin at the W. extreme of the Gulf of Tejooreh, is 12 m. long and half as broad, with a rocky islet at the entrance about 40 ft. high, called Bab, or the Gate. The S. channel, not 2 cables broad, has shoal water $3\frac{1}{2}$ fathoms. The N. channel, only 50 yards wide, has not less than 17 fathoms. Tides rush rapidly through these channels, causing whirls and rippings which alarm a stranger. The centre of this bay, or Gubet, has 100 fathoms, and all around it the depths are too great for anchorage. At the W. extreme of the Gubet, there is a natural deep basin about 300 yards across, and with 16 fathoms water in it. The entrance is shallow, closed even for boats at L. W. by a rocky ridge. The water is always running from it, and the natives imagine that it comes underground from the salt lake, **Bahr Assal**, which is nearly $2\frac{1}{2}$ leagues to the N.W.; this lake is said to supply all Abyssinia with salt. The heat in Gubet Kharab is very great, the cliffs being so steep to the N. and the S., whilst the W. side is strewn with lava and volcanic remains; the thermometer in shade, during six days of Sept., ranged from 92° to 110° .

Further information about **Bab-el-Mandeb Straits** and **Aden** will be found in Section First, page 30, and again in Chapter 9.

WINDS AND WEATHER BETWEEN ZANZIBAR AND ADEN.

ZANZIBAR. The disastrous hurricane of April, 1872, at this port—hitherto, so far as known, exempt from such fearful visitations—claims precedence in our notice of the winds and weather between Zanzibar and the Red Sea. That harbour has many outlying shoals and islets which serve to shelter the anchorage; but the great breadth of the channel between the island and the main land of Africa—nowhere less than 16 m., and generally exceeding 25 m. in width—explains how a heavy swell could arise in a violent storm, such as even Bombay has been subject to, at the change of monsoons. So terrible a disaster may induce His Highness, the Sultan of Zanzibar, to introduce European ideas as to harbour conservancy, berthing of ships, storm signals, and such like precautionary measures. Mariners should also be reminded that similar hurricanes have occurred at Mozambique; one on April 1st and 2nd, 1858, did great damage, and wrecked 7 out of 10 vessels then in port.

Prevailing Winds at Zanzibar, for nearly 9 months of the year, range between the S. and the E.; during the other 3 months, from mid-Dec. to mid-March, the wind blows from the N.E., with considerable force in Jan. and Feb. At the change of monsoon, about end of March or early in April, heavy squalls blow from the S.W. and W., accompanied with heavy rain. The hurricane of April 15th, 1872, warns all ship-masters to expect at this season, and to be prepared for a similar storm. There are two rainy seasons at Zanzibar; the heaviest in March, April and May, and the lesser in Sept. and Oct. The hottest months are Jan., Feb. and March (the N.E. monsoon); the coolest are July, Aug. and Sept., when the cool waters of the S. Indian Ocean are propelled by the S.E. trade-wind between the Seychelles and Madagascar.

Sailing-Vessels making Zanzibar during the entire S.W. monsoon should make for Latham Island, as the N. current is so strong. **When leaving**, they should go out by the N. channel. In the N.E. monsoon, the S. channel should be adopted for leaving.

SOCOTRA ISLAND is situated only a short distance from the continents of Africa and Arabia; yet, from both monsoons blowing over a vast expanse of ocean, it enjoys, at least as compared with them, a remarkably temperate and cool climate. The mean daily temperature on the plain, from mid-Jan. to mid-March in 1834, was $70\frac{1}{2}^{\circ}$ Fah. In the S.W. monsoon, from June 1st to July 13th the thermometer ranged from 80° to 95° . On the mountains it is of course much cooler. It appears that frequent and heavy rains are experienced on the Island, even as early as March, and during the S.W. monsoon the fall is very great, rendering the climate moist, but not unhealthy.

Anchorage. Socotra has no ports in which a vessel can ride in safety, protected from all winds. The island is so placed that only on opposite sides are vessels perfectly safe during the prevailing monsoon. There are, however, several bays and anchorages, which, with E. and E.N.E. winds, afford good shelter. Amongst these are Gubet Koormeh, Gollonseer, Gubet Sharb, Bunder Ney, Bunder R'dresseh and Bunder Fikeh; also Tamareed, when the wind is E., and if anchored close in shore. During N.E. winds, Gubet Koormeh, Gubet Gollonseer, Bunder Sharb, Bunder Ney and Bunder R'dresseh afford tolerable shelter; which may also be found close in shore on the

S. side of the Island. In N.N.E. winds, Gubet Sharb is the only bay where shelter may be found on the N. side of the Island, all others being a dead lee shore. At Bunder Ney, and close in on the S. side, the anchorage is good.

The natives report that the only good anchorage in the S.W. monsoon is at Bunder Deleeshi; by this is meant where a vessel would feel neither wind nor sea, the water being perfectly smooth, almost without a ripple, and where several vessels have ridden out the monsoon. A vessel might be sheltered from the sea in all bays between Ras Kadarmeh and the W. extreme of the Island; these are Koormeh, Kadhoop, Tamareed, Deleeshi, Gurrieh and Fikeh; but would experience violent gusts of wind from the mountains and valleys. Good ground tackle would be necessary, the anchorage being on a narrow bank, and the soundings quickly deepening to the N.

Winds. From Nov. to Jan. the prevailing wind is N.N.E., the most dangerous on the N. side of the Island, blowing in violent gusts for several days at a time, rendering it almost impossible for anchors to hold, the bottom being very indifferent as anchoring ground. During these months great quantities of rain fall; but this is not the case every year, as a drought has been frequently experienced on the Island. From Feb. to May is the fine-weather season, when the anchorages on the N. coast are considered safe. In April the trading-boats from India frequently put into Bunder Fikeh for water.

In June, July and Aug., the natives say it blows incessantly in hard and violent gusts on the N. coast; but on the low land of Naukad the wind is more steady and less violent, with, however, a tremendous sea and surf. In these months rain falls in showers, but not equal in quantity to that which falls during the squalls of Nov., Dec. and Jan. In Sept., Oct., and part of Nov., light land and sea-breezes are experienced, towards the latter part becoming more steady from the N.

GULF OF ADEN.—The S.W. Monsoon commences in the Arabian Sea, about the middle or end of April, and continues to the end of Sept., liable to a variation of from 10 to 15 days, being sometimes earlier, sometimes later, but is not felt in full force until May or even June; it continues in force during the months of June, July and Aug., blowing stronger and steadier, and accompanied by a swell which is very heavy in the open sea about 100 m. to the E. and S.E. of Hafoon, and at the same distance to the S. and the S.E. of Socotra.

On the E. coast of Africa the wind blows very strong from the S.S.W., and continues with full force from that quarter through the channel between the island of Socotra and Cape Guardafui, and thence more from S. and from S.S.E. across the Gulf of Aden to Ras Rehmat (which signifies in Arabic, the Cape of Wind's Death, where the sand is blown far up the face of the hills when gusts of wind occur there), a cape to S.W. of Makalleh. On this line a vessel generally enters the monsoon when proceeding from the Red Sea to the E.

Within the Gulf of Aden—that is, between the meridians of Guardafui and Bab-el-Mandeb—the winds, during the season, are very variable; as a general rule, they are freshest by day and lightest by night. In April and May they vary from E.N.E. to S.E. and S. with clear weather, but hazy weather is sometimes experienced; close in-shore land-winds are occasionally felt from 4 h. to 8 h. a.m. June is a very unsettled month, the wind uncertain; weather at times clear, but generally hazy; in the morning it is either calm, or there are very light airs, which sometimes increase towards noon to a fresh breeze from the S., occasioning a long swell on the Arabian coast. Towards the middle of the month, and in July and Aug., between Burnt Island and Bab-el-Mandeb, strong W. and S.W. winds may be expected, blowing as N.W. winds through the Straits with violence, and sometimes enabling a vessel bound to India to reach the monsoon; but as a general rule a vessel will lose the wind before reaching Ras Rehmat, and will not fall in with it again until it bursts from the S. through the channel between Socotra and the main land of Africa.

Vessels on the Arabian coast, between Aden and the Straits, in the months of June, July and Aug., will often experience thick hazy weather, if the wind is from N.W., fresh gusts of winds may be looked for, especially in-shore; and sometimes the wind will change quite suddenly, and blow fresh from the S. During these months it is very necessary to have good sails bent, and care should be taken to be on the bank of soundings at the turn of tide, to enable a vessel to anchor in shallow water, should it fall calm, or the current be too strong for her. On the African coast it is equally necessary to have good sails bent, as the gusts from the shore are, at times, very violent. Moderate S. winds may also be expected on the Arabian coast during these months, blowing only during the day, declining into a light air at night. In the evening, after the S. wind dies away, severe land squalls are not unfrequent along the Aden coast, which, rising in a thick cloud of dust, give ample warning to the seaman. There is always a long S. swell on the Hadramaut coast at this season.

Near the coast of Africa, from Ras Feelook to the W., at this season, heavy land squalls are experienced from about S.S.W., and generally come off between midnight and daybreak, lasting

about an hour, frequently followed by a calm, and as frequently by a W. or W.S.W. breeze. These land-winds are always parching hot, and very disagreeable. In Sept. the W. winds cease, and land and sea-breezes prevail, as also in the month of Oct. The nights are calm and sultry.

The atmosphere in the S.W. monsoon is generally very hazy, and the land consequently not visible till very close, rendering it necessary to pay great attention to the lead. On making the coast at the N.E. point of Africa during the S.W. monsoon, the best signs of being near the land are the gradual change in the colour of the water from blue to dark green, and the alteration in the direction of the swell, caused by the prominent Cape Ras Hafoon.

The N.E. Monsoon commences in the Arabian Sea, about mid-Oct., and prevails during Nov., Dec., Jan. and Feb., after which the winds become light and variable, until the setting in of the other monsoon. It blows a steady moderate breeze from the N.E., in the open sea, with fine settled clear weather, and a smooth sea; but within the limits of the Gulf of Aden, the wind is very variable. There the N.E. monsoon commences early in Nov., the prevailing winds being E. and E.N.E., blowing fresh at F. and C. of the moon. At the end of Dec., or early in Jan., it frequently blows a moderate gale with heavy rain. In Jan., Feb. and March, E. and E.N.E. winds are common, increasing in strength towards the Straits of Bab-el-Mandeb, beyond which they blow up the Red Sea as S.E. and S. winds. The weather is generally clear and pleasant; thermometer ranging from 68° to 80° Fah. Rain may sometimes fall, but not in any great quantity at sea: although, against the face of the African mountains, a considerable precipitation often occurs, and is carried off by numerous water-courses into the sea. These three months are the principal for trade.

The Temperature of the atmosphere in the Gulf of Aden varies with prevailing winds; the following is the average range of the thermometer throughout the year.

Jan. Feb. and March.—Weather generally clear. Ther. ranges 68° to 80° Fah.

April.—The weather becomes warmer. Ther. 80° to 86°.

May.—Owing to light winds and calms, it is frequently very hot. Ther. 84° to 95°.

June.—During a W. wind, temperature is much lower, and the change on leaving the Red Sea surprising. In July and Aug.—Ther. ranges 80° to 87°. The coolness of these months is much owing to the low temperature of the sea-water propelled by the S.E. trade from the S. ocean.

Sept.—Again warm, owing to cessation of W. winds. Ther. ranges 84° to 96°.

Oct.—Towards the end of this month the nights become cooler, and at sunrise the thermometer will sometimes stand as low as 78°.

Nov. and Dec.—From commencement of Nov. the weather gradually becomes cooler as the N.E. monsoon increases. Ther. ranging between 76° and 84°.

During the S.W. monsoon, on the African coast the heat is insufferable, especially when a land-wind is blowing, at which time the thermometer will sometimes rise to 110° Fah. The natives always leave the coast at this season for the mountains to escape the heat, and there is consequently a total cessation of all trade.

Gales. No gales of any strength are likely to be experienced in the Gulf of Aden, beyond those mentioned in the remarks on the monsoons.

The Sea on these coasts is remarkable for its occasional peculiar brilliancy at night; without any warning it will become suddenly illuminated, as if on fire, causing alarm to any one unacquainted with the phenomenon, by giving the idea that his vessel is amongst breakers; but, on casting the lead, the deception becomes apparent. It occurs in the open sea as well as near land, and whether calm or with a breeze blowing.

POPULATION AND TRADE—SOCOTRA AND SOMAULI COAST.

SOCOTRA ISLAND is under the government of the Sultan of Kesheen, on the Arabian coast, but his rule is merely nominal. A relative of his makes an annual visit for the purpose of collecting revenue, which in 1833 barely exceeded in value 200 dollars. There does not appear to be any constituted authority, either civil, military, or of any description whatever; nor is there distinction of rank: all are respectable in proportion to their wealth in flocks and herds. Notwithstanding the singular anomaly of so great a number of people residing together without chiefs or laws, offences against the good order of society are uncommon; theft, murder, and other crimes are almost unknown. The people possess no maritime enterprise, consequently have no trading boats, but they do not appear averse to commercial pursuits. In commercial transactions amongst themselves, money is rarely or ever used, and certain quantities of ghee are substituted. Dollars or rupees are demanded of strangers visiting the ports. All silver obtained in exchange for articles supplied by them is

made into ornaments for their women. They have no mechanics on the Island, nor is there any timber fit for ship-building purposes, so that a vessel in distress requiring repairs could receive no assistance from them.

The inhabitants of the Island may be divided into two classes—the Bedouins, or those who inhabit the mountains, and the high land near the W. extremity of the Island, and who, there is every reason to believe, are the aborigines; and those who reside in Tamareed, Kadhoop, Gollonseer, and the E. end of the Island, a mongrel race, descendants of Arabs, African slaves, Portuguese, and several other nations. The whole population of the Island amounted in 1833 to about 4,000. There is a language peculiar to the Island, which is in general use by those who have permanently settled there; but Arabic is spoken by the merchants when transacting business with traders who visit the Island in their baghalahs. The Bedouins from the Arabian coast are sometimes able to make themselves well understood by the Bedouins of Socotra, but the Arabs from Muskat are quite unable to do so. The dialect of the Island is not now a written language, although it appears to have been so once.

Early History of Socotra. The talented Colonel Henry Yule, of the Bengal Engineers, has given most interesting information in "The Travels of Marco Polo," about Socotra, as the famous Venetian wrote it. In the Colonel's Notes, we have the benefit of his researches amongst the writings of old authors. Of this island, he says:—

"So much painful interest attaches to the history of a people once Christian, but now degenerated almost to savagery, that some detail may be permitted on this subject. The 'Periplus' calls the island very large, but desolate;..... the inhabitants were few, and dwelt on the N. side. They were of foreign origin, being a mixture of Arabs, Indians, and Greeks, who had come thither in search of gain..... The island was under the King of the Incense Country..... Traders came from *Muza*, and sometimes from *Limyrica* and *Barygaza* (Canara and Guzerat), bringing rice, wheat, and Indian muslins, with female slaves, which had a ready sale. Cosmas (8th century) says there was in the island a bishop, appointed from Persia. The inhabitants spoke Greek, having been originally settled there by the Ptolemies..... The Arab voyagers of the 9th century say that the island was colonised with Greeks by Alexander the Great, in order to promote the culture of the Socotrine aloes..... The colonising by Alexander is doubtless a fable, but invented to account for facts."

Marco Polo says of Socotra, "The people are all baptized Christians; and they have an archbishop..... There is a great deal of trade there, for many ships come from all quarters with goods to sell to the natives. The merchants also purchase gold there, by which they make a great profit; and all the vessels bound for Aden touch at this island."..... "Abulfeda says, the people of Socotra were Nestorian Christians and pirates. Nicolo Conti, in the first half of the 15th century, spent two months on the island (*Sechutera*). He says it was for the most part inhabited by Nestorian Christians. When Francis Xavier visited the island, there were still distinct traces of the Church. The people revered the cross, placing it on their altars, and hanging it round their necks..... No man could read. The Kashees (Presbyters) repeated prayers in a forgotten tongue..... The last vestiges of Christianity in Socotra, so far as we know, are those traced by P. Vincenzo, the Carmelite, who visited the island in the middle of the 17th century. The people still retained a profession of Christianity, but without any knowledge, and with a strange jumble of rites; sacrificing to the moon; circumcising; abominating wine and pork. They had churches which they called *Moquams* (Arabic, *Makám*), dark, low, and dirty, daily anointed with butter. On the altar was a cross and a candle. The cross was regarded with ignorant reverence, and carried in processions."

"Now, not a trace of former Christianity can be discovered..... The remains of one building, traditionally a place of worship, were shown to Wellstead; he could find nothing to connect it with Christianity."

The Productions of most importance are the *aloe spicata*, called in the language of the Island *tayef*, and by Arabs *soobah*; and the dragon's-blood-tree. The Island has been famous for the first-named plant from the earliest period; it grows spontaneously on the sides and summits of limestone mountains, at an elevation of 500 to 3,000 ft. above the level of the plains. In 1833 the best kind sold for one rupee the Bengal seer (about 2 pounds English), or one dollar for four seers of the more indifferent. The Socotrine aloe should be the purest in the world; but, owing to the careless manner in which it is gathered and packed, it contracts many impurities, and its value becomes proportionately deteriorated. The quantity exported varies very much; in 1833 it amounted to 88 skins, or about 2 tons. Much more might be procured, the hills on the W. side of the Island being thickly covered with plants for an extent of miles; but, owing to the indolence of the inhabitants, it is only collected when the arrival of a ship or baghalah creates a demand.

Next in importance to the aloe comes the dragon's-blood tree (*pterocarpus draco*), the gum from which (*sanguis draconis*) is collected at all seasons. Like the aloe it is usually met with on the hills, rarely at a less elevation than 800 ft., and frequently as much as 2,000 ft. above the level of the sea. The gum exudes spontaneously from the tree, and it does not appear usual, on any occasion, to make incisions in order to procure it. The price of the best is, at Muskat from 6 to 8 rupees the Bengal seer; not above one-tenth of the quantity which might be procured is collected; as with the aloe, this appears consequent on there being no regular demand. Dragon's blood is called by the Arabs *dum kholid*, and *edah* by Socotrians. A light-coloured gum is also procured from a tree called, in the language of the Island, *amara*, which is slightly odoriferous, but inferior to the *luban* of the Arabian coast.

The wood of a tree named *metayne*, or *malarah*, which abounds in every part of the Island, is so hard as to answer the same purposes as *lignum vite*, for sheaves of blocks, splicing fids, &c.

The only grain cultivated on the Island is a species of millet called *dakkan*; this is preferred to any other, because requiring little attendance, and producing a crop at any season. No *dakkan* is grown on the W. side of the Island; but on the E., the enclosures amidst the valleys are numerous. It is to date groves, next to flocks, that the inhabitants look for their principal means of support; though, with the exception of a small one at Gollonseer and another on the W. side of the granite peaks, these are confined to the E. portion of the Island. Here the borders of numerous streams are lined with them; but notwithstanding the large quantities collected from the whole of these groves, the supply is not sufficient for the consumption of the inhabitants, and a large import takes place annually from Muskat. In the vicinity of Tamareed are some enclosures of beans, and a little tobacco is grown, sufficient for the inhabitants.

Vast flocks of sheep and goats are found on every part of the Island; the latter are, indeed, so numerous that the owners keep no account of them. Oxen are very numerous near Tamareed, and on the mountains in its vicinity. Cows are kept mostly for their milk, from which the ghee, so much esteemed in Africa and Arabia is made; the natives are not, therefore, solicitous to part with them, and the prices they demand are proportionately high. There are a great number of asses in the Island, permitted to stray where they please; camels having superseded them as beasts of burden.

The only wild animals known among the hills are civet cats, which are very numerous. Antelopes, hyænas, jackals, dogs, monkeys, and other animals which are common to the shores of either continent, are unknown here. On the lowlands, scorpions, centipedes, and a large and venomous description of spider, called *nargub* by Arabs, are common. Ants are very numerous, and the bite of one kind is scarcely less painful than the sting of a wasp. On the hills rats and other vermin are common. The chameleon is a native of the Island.

SOMAULI COAST PEOPLE. From Ras-al-Khyle on the E. coast to Zeyla, the country is known by the name of Bar-e-Somal, and it is divided between two great nations; who, both tracing their origin from the Arab province of Hadramaut, are yet at bitter and endless feud with each other. The principal of these two great families is that to the E. of Burnt Island. The other extends from Burnt Island, or Bunder Jedeed, to the Essah tribe, who reside in the neighbourhood of Zeyla, and is divided into three great tribes, namely, the Haber Gerhajis, the Haber Awal and the Haber-al-Jahleh (Haber meaning *the sons of*), who were the children of one Isaakh, who crossed from Hadramaut some time after his countrymen had founded the nation to the E., and who settled at the town of Meyt, near Burnt Island, where his tomb exists to this day. The eldest branch, the Haber Gerhajis, was put in possession of the frontier mountains to the S.; and the other two brothers were placed on either side of them; the Haber Awal establishing themselves on the lowlands from Berbereh to Zeyla, and the Haber-al-Jahleh locating themselves at Karram, Enterad, Ankor and Hais, four small ports to the E. of Berbereh. To the E. of Meyt, as far as Bunder Ziadeh, are the warlike tribe of the Wursoongli (which name means *has brought good news*); and thence to the E., round Ras Jered Hafoon, and down to Ras-al-Khyle, the country belongs to numerous clans of the Mijjertheyn. These are the tribes on the coast. Although at constant war amongst themselves, they are friendly and obliging to strangers.

From Ras-al-Khyle to Berbereh, the Wadi Nogal extends in almost a straight line between two ranges of mountains. The *happy valley* is spoken of in most glowing terms by the natives, and apparently forms their great road for trade; the people of Ogahden, Murreyhan, &c., bring all their gums, ivory and ghee along this valley, as being the safest and least fatiguing route; and the people are described as a peaceful race, who subsist chiefly by the chase, and by their sale of ostrich feathers, myrrh and ghee.

Productions. In a commercial point of view, the Mijjertheyn and Wursoongli territories are most valuable, and a vessel of 300 or 400 tons might with ease procure a cargo of gum arabic,

luban and myrrh, at any of the ports belonging to these tribes. Arrangements should be made with the merchants on the coast before the commencement of foul weather—say the month of April—to have a cargo ready by the end of August; the coast is then approachable, and the gums could be shipped off at Bunder Marayeh, Bunder Khor, Bunder Ziadeh or Bunder Ghasim, with but little delay. The name of an Englishman is much respected by the natives, who make a marked difference between them and any other nation. Promises of all kinds were made to Captain Cruttenden, of the Indian Navy—who was much amongst them, and from whose memoirs these remarks are taken—that they would give every facility to the English merchant who should bring his wares to them, and could thus afford to sell them cheaper; and one or two offered to guarantee a certain supply annually, if arrangements were made in time. It would be useless, however, to send out a vessel without some person who understood the character of the people, and who could converse in Arabic with them, without the aid of an interpreter.

To the W. of the Mijjertheyn the Wursoongli range, 4,000 ft. high, affords an inexhaustible supply of frankincense, though but little gum arabic, and no myrrh. The climate in these mountains is described as most invigorating, and the country abounds in large game, the lion being very common in those parts.

Westward of the Wursoongli, gum trees become scarce; and though there are some parts having considerable trade throughout the year, all their gums are brought from the Dalbahanti and Ogahden tribes. Sheep form the chief exports from Karram and to the W.; the countless flocks that are driven down almost daily, and shipped off for the Arabian coast, almost exceed belief. Berbereh is of course the greatest mart at one season of the year, as all the tribes collect there; but an English vessel would do little when placed in competition with the Banyans, whose cargoes are, generally speaking, engaged the season before. It is not therefore advisable for a vessel to go to Berbereh to trade, but endeavour to be off the E. ports as soon as the season opens; the gums are then all packed in readiness for shipment, and very trifling delay would occur. To the W., there are no trading ports between Berbereh and Zeyla, at which latter place a vessel would doubtless obtain a valuable cargo of coffee and mules, but probably much time would be lost. But a small quantity of gum is brought into Zeyla; coffee, dye and ghee, with ivory in small quantities, and ostrich feathers, form the articles of export. The average quantity of gums, exported annually from the Somauli coast, may be estimated at 1,500 tons; though occasionally, after a good season, the Mijjertheyn tribe alone probably export nearly that quantity. The trading season on the coast is from the early part of Oct. to the end of March.

Harrar City, in the province of that name, though hardly in the Somauli country, is closely connected with it by commerce, especially by its slave trade. It is eight days' journey for a kafleeh of camels from Zeyla and nine days from Berbereh, placing it in about lat. $9^{\circ} 22' N.$, lon. $42^{\circ} 35' E.$ The city is described as larger than Mocha, and situated in a fertile country, but fast decaying. The coffee districts are described as lying amongst a low range of mountains near Harrar, and to the S. The quantity exported is very large, and the quality fully equal to that commonly sold at Mocha. Besides coffee, Harrar exports white cotton cloths, the cotton of which they are made is grown at Harrar; a few silk loongis are also manufactured: cardamoms, gum mastic, myrrh, a small quantity of manna, saffron and safflower, with the articles above mentioned, comprise the extent of Harrar trade, so far as regards produce; but the most valuable branch of commerce is the export of slaves. The duties levied at Harrar are 10 per cent. on import and export, and a further tax of 6 pounds of brass or $2\frac{1}{4}$ dollars is laid on slaves of both sexes.

In the country of the Haber Gerhajis, the principal articles of trade or produce are ghee, myrrh in small quantities and of inferior quality, luban of the first quality, ivory, ostrich feathers, and gum arabic, with a small quantity of *sheima*, or orchilla weed, and a still smaller supply of *warus*, a kind of saffron, used by natives in Yemen to rub over their bodies.

Ras Hafoon, or the Surrounded, is a peninsula or prominent headland, nearly square, of from 400 to 600 ft. in height, rising in steep cliffs from the sea, and formed of sandstone and limestone. The outer edge of the peninsula is perfectly flat and tabular; the interior consists of undulating hills, deeply intersected by ravines and the courses of mountain torrents. It is connected with the main land by a long narrow neck of white sand, shells and mud, with a few stunted bushes thinly scattered along it, and from its being almost an island (probably it was one many centuries ago) it takes its name of Hafoon. On either side of the narrow neck of sand, is formed a deep bay with good anchorage, according to the season. The S. bay is of course best adapted for ships during the N.E. monsoon, but a change of two or three points in the direction of the wind causes a swell to roll in, and a surf to break on the beach. The bay is much frequented by shark fishers from the Arabian coast, many of whom reside here throughout the year, merely moving their fishing boats to the other side of the isthmus as the monsoon changes. The peninsula is in the Mijjertheyn

territory, and tenanted by the Aial Fatha branch of the Othman family; there are only a few miserable huts, and a population of probably 50 persons; they are friendly to strangers, and may be trusted. The water in the wells is bad. Cattle and firewood are procurable.

On the N. side of the isthmus of Hafoon is an extensive harbour, called Khor Hardeah, $2\frac{1}{2}$ m. wide at its entrance, and extending 12 m. into the coast. As an anchorage it is only available for boats, the depth of water inside being only 1 to $1\frac{1}{2}$ fathoms. This is probably the most unhealthy spot on the Somauli coast; its shores and the bottom of the bay are covered with decomposed vegetable matter, which on being disturbed gives forth a noxious gas that is perfectly sickening: yet there are many fishermen living on the sea-shore, who from long habit have become accustomed to the exhalations. There is no fresh water in the bay, but it is said by the natives that at the bottom of the bay, at a place called Khor Hashera, there is a stream of fresh water running into the sea. It is possible that the river mentioned in old writers as existing in the neighbourhood of Hafoon, may be this stream, and Khor Hashera the ancient Opone.

During the S.W. monsoon, a kind of fair similar to that at Berberah, though smaller, is annually observed at Khor Hardeah. The merchants from Makalleh, Shehr, and from the Mijjertheyn bunders to the N. and the W., attend this meeting at the end of May, when their baghalahs are hauled up on the beach; and a brisk trade is carried on throughout the S.W. monsoon in gums, ostrich feathers, hides, ivory and ghee; large quantities of ambergris are also brought for sale, and the price demanded is very great. Elephant hunting is followed by those who have guns. A good trade might be carried on between Mauritius and Hafoon in asses; these might be procured at Hafoon in great numbers for five or six dollars each, and the voyage being so short in the N.E. monsoon, would probably afford a good speculation.

Bunder Marayeh is the principal town on the coast, about 50 m. to the W. of Cape Guardafui: it is situated close to the beach, 7 m. to the S. of Bunder Feelook, and is defended by five forts. Here is a large trade in gums, which at present lies entirely in the hands of Banyan traders, but it is open to the English, there being every desire on the part of natives to have commercial dealings with them. It is only necessary to make arrangements with the merchants at the commencement of the foul weather, to have a cargo ready as soon as the coast is approachable, towards the latter end of August.

The anchorage off the town is good, in from 5 to 10 fathoms water, the soundings increasing gradually to 20 fathoms at $1\frac{1}{2}$ m. distance from the shore, after which they become irregular with over-falls; the edge of the bank lies 5 m. from shore. To the N. of the town is a mangrove swamp, and the bed of a water-course, which extends in the direction of the mountains. Good water may be obtained from a well 2 m. inland; bullocks, sheep and firewood in abundance.

Bunder Khor, about 35 m. to W. of Marayeh, has a considerable trade in gums, &c.; which, as at the latter place, might be made available for English vessels, but is at present enjoyed by Banyan traders. Here, as at all the towns on the coast, sheep, firewood and water are to be procured.

Bunder Ghasim, a town and anchorage $7\frac{1}{2}$ m. to the W. of Ras-al-Hamr, consists of about 100 huts and five forts. It is the principal town of the Mijjertheyn Somaulis, and has a large trade in gums, &c. Off the town is a coral bank, dry at L. W., extending $\frac{1}{2}$ m. from the shore, outside of which is moderately good anchorage in from 6 to 8 fathoms water, over a sandy bottom, but not protected, being an open roadstead. One mile and a half to the W. of the town is the bed of a broad stream, which after heavy rains discharges a large quantity of water into the sea. There are wells in all the forts, from which good water may be obtained; sheep and firewood are procurable.

Bunder Ziadeh, a small town and fort, 12 m. W. of Bunder Ghasim, is the termination of the Mijjertheyn territory. The Wursoongli tribe, who inhabit the coast from Bunder Ziadeh to Bunder Jedeed, are divided into several clans; a powerful and warlike people. Brothers by the same mother of the Mijjertheyn, they generally coalesce should war break out; but petty feuds and plunder are of frequent occurrence. It is worthy of remark, that in this tribe theft is looked upon with abhorrence, though doubtless in the event of a wreck they would consider it fair to plunder. Their country may be described as a plateau of limestone mountains, precipitous to the N., and gradually sloping to the S. Between the mountains and the sea, undulating ranges occur, intersected by ravines and thickly wooded; whilst the belt of level ground near the sea is thinly sprinkled with bushes, exhibiting a plain of white sand.

Frankincense, myrrh, *sumuk* or gum arabic, *sheneh* (orchil), and ghee form the export of this tribe; and a peculiar kind of gum, called *felleh felleh*, which is imported into Aden in large quantities from the coast.

Ras Goree is a low sandy point, $7\frac{1}{2}$ m. W.S.W. of Bunder Gahm, on which are several small

sand-hills, and a khor or lagoon of brackish water, which is little more than a swamp. On the W. side of the point is situated the principal town of the Wursoongli tribe, called Bunder Goree, consisting of three forts and two large villages. Here is a large trade in gums. Anchorage off the town is bad, the bottom being rocky, and soundings very irregular; the best berth would probably be found N.E. of the town, in 7 to 10 fathoms, $\frac{1}{2}$ m. from the shore. Cattle, water and firewood are procurable at the town.

Bunder Jedeed, a small village $6\frac{1}{2}$ m. to W. of Ras Suereh, close to the beach, is the boundary of the Wursoongli territory. The inhabitants are not always inclined to be civil to strangers.

Meyt or Burnt Island is a barren rock, elevated 430 ft. above the sea, perfectly white, being covered with guano, which is collected and carried in native boats to the Shehr and Makalleh markets. It is situated $5\frac{1}{2}$ m. from Ras Hambais, the nearest point on the main land. Jebel Meyt, a hill 1,200 ft. high, stands on the coast about 5 leagues to S.W. of the Island.

Mention was formerly made in Horsburgh's "Directory" of a *spring of water* existing on the S. side of the Island, near the centre; this however appears to be an error, as no water is found except after rain, which, lodging in pools on the summit of the rock percolates through, and finds exit close to the water's edge. The face of the rock on the S. side of the Island is frequently moist, and bears the appearance of rain having filtered through its crevices. On that S. side there is a remarkable cove or natural dock, capable of admitting a ship of 300 tons, by clenching the ends of a cable through holes in the rock: the remains of two clenches of cables were found affixed to the rock in 1801. In Oct. 1844, the remains of a hempen cable were found, which had been apparently rove through a hole in the rock.

Sailing Directions. Vessels bound to Aden or the Red Sea during the S.W. monsoon, should keep along the Somauli coast until off Meyt Island, when they should stretch off from it for the Arabian coast.—(See **Meyt**, at page 114.)

MEYT. Two m. to the E. of Jebel Meyt is the town and tomb of Meyt or Meyet, the burial-place of the founder of the Edoor nation, and their present E. limit. It is situated on a small plain, bounded in the S. and S.W. by the W. extreme of the lofty mountains Al Wursoongli, which here approach within two hours' journey of the sea. From Meyt a large quantity of white ebony is exported, also a long and thin rafter used both at Aden and on the coast in the construction of native houses. The hills immediately over the town afford a large supply of very fine gums, and the place carries on a considerable trade with Aden and Makalleh. The stranger is at once struck with the magnitude of the burial-ground at Meyt, which extends for fully a mile each way. Attachment to the memory of their forefather, Isaakh, yet induces many aged men of the W. tribes to pass the close of their lives at Meyt, in order that their tombs may be found near that of their chief; and this will account for the unusual size of this cemetery. Many of the graves have head-stones of madreporé coral, on which is cut in relief the name of the tenant below; of these many are to be found 250 years old.

BERBEREH HARBOUR, the only sheltered one on the coast, lies in a direction E.N.E. and W.S.W., and is formed by a curve in the coast line. The town of Berberéh is situated at the head of the harbour, and varies in dimensions and population according to the season of the year. From Oct. to March, or the trading season, the population amounts to 10,000 or 15,000 souls. The tribes from the interior commence to assemble in Oct., and are constantly arriving as late as March, bringing with them the produce of the country, which consists of ghee, ivory, myrrh, gums, coffee, cotton, &c.; these are exchanged for cotton cloths, piece goods, shawls, copper wire, zinc, &c. The trade is entirely in the hands of Banyan merchants, who enter into agreements with the tribes for the produce of the following year, and have their baghalahs ready in the harbour to receive it as soon as it arrives. At the end of March the town and harbour are entirely deserted, the natives leave for the mountains, carrying with them their hides and mats of which their houses were formed, and nothing remains but the skeleton frames, giving the place a most dreary appearance.

The annual fair, which commences in Oct. and lasts till the end of March, is one of the most interesting sights on the coast. As soon as the season changes the inland tribes commence moving down towards the coast, and prepare their huts for the expected visitors. Small craft from the ports of Yemen (anxious to have an opportunity of purchasing before vessels from the Persian Gulf arrive) hasten across, followed about a fortnight to three weeks later by large vessels from Muskat, Soor and Ras-al-Khaimah, and the valuably freighted baghalahs from Bahrein, Bussorah, and Koweit; lastly, the fat and wealthy Banyan traders from Por-bunder, Mandavee and Bombay, come across in their clumsy kotiehs, and elbow themselves into a prominent position in the front tier of vessels in the harbour, and by their superior capital, cunning and influence, soon distance all competitors.

During the height of the fair, Berbereh is a perfect Babel in confusion, as in languages; no chief is acknowledged, and the customs of bygone years are the laws of the place. Disputes between inland tribes daily arise, and are settled by the spear and dagger, the combatants retiring to the beach at a short distance from the town, in order that they may not disturb the trade. Long strings of camels are arriving and departing day and night, escorted generally by women alone until at a distance from the town; or an occasional group of dusky and travel-worn children marks the arrival of the slave kafilah from Harrar and Efaht.

By the end of March the fair is nearly at a close, and craft of all kinds, deeply laden, and sailing generally in parties of three or four, commence their homeward journey. The boats of Soor are generally the last to leave; and, by the first week in April, Berbereh is again deserted; nothing being left to mark the site of a town, lately containing perhaps 20,000 inhabitants, beyond the bones of slaughtered camels and sheep, and the frame-work of a few huts carefully piled on the beach in readiness for the ensuing year. Beasts of prey now take the opportunity to approach the sea: lions are commonly seen at the town wells during the hot weather; and in April, 1847, but a week after the fair had ended, three ostriches were observed quietly walking on the beach.

The great drawback to Berbereh, as a port, is the scarcity of good water, that in the two wells belonging to the town being brackish; the wealthier portion of the merchants therefore send to Seyareh for a supply. Remains of an ancient aqueduct and reservoir are still to be seen; the latter is about $\frac{1}{2}$ m. from the beach, and the former 9 m. in length, in the direction of the nearest range of hills, named Dthubar.

There is an extensive burial-ground with the remains of a mosque in the vicinity of Berbereh; the ground is strewn with human skulls and bones. The natives report that at one time a large town existed here. That Berbereh has existed as a port of great trade for several centuries, is almost sufficiently proved by the fact of its being an annual rendezvous for so many nations, and from the time of this great meeting having been chosen so as to suit the set of the Red Sea and Indian monsoons. But beyond the aqueduct mentioned above, it exhibits no proof of antiquity.

The Haber Awal branch of the Edoor tribe occupy the lowlands between Berbereh and Karangarit, near Zeyla, a fertile tract of country, with several low ranges of hills, averaging perhaps 40 m. in depth, by 90 m. in length. The number of sheep and camels found on these plains is perfectly incredible; asses are very numerous, and most admirably adapted to the country. The camels are small and weak, and never used for riding, except in cases of sickness, or a wound. The Haber Awal have no chief; the customs of their forefathers are the laws of the country, and appear to be based upon the simple principle that might gives right. Theft is punishable with the loss of the right hand, but, fortunately for them, this is not insisted on, for they are most inveterate thieves.

ZEYLA is a place of some importance, being the only port on the Essah coast, and having a trade with Mocha and the neighbouring parts. It is built on a low sandy point, nearly level with the sea, projecting to the N.E., called Ras Hamar, and consists of a mosque, 12 to 15 stone houses, and probably 200 huts, the whole enclosed within a mud-wall, which is in a most ruinous condition. The population in 1848 amounted to about 750 souls. Zeyla, no doubt, was originally intended to serve as a sea-port for Harrar, for of itself it appears to be worth little. A vessel of 250 tons cannot approach within a mile of the town, and the anchorage is shallow, and difficult of entrance after sunset, on account of the numerous reefs.

The town is now under the Sheriff of Mocha, who has the power of displacing the governor, should he think fit, but who yet receives no part of the revenue. The governor pays an annual tribute of 750 German crowns to the Sheriff, and reserves all that he can collect above that sum for himself. A tax of one dollar is levied upon each slave exported from Tejooreh, or imported from Harrar, and afterwards sold at Berbereh. The principal articles of export are coffee, dye, ghee, ivory in small quantities, and ostrich feathers. A vessel would doubtless obtain a valuable cargo of coffee and mules. But a small quantity of gums is brought into Zeyla. There are a few Arab and Somaui soldiers kept for the defence of the place. Water is supplied from a water-course about 4 m. S.W. of the town, where there is a small tower and a guard of five or six soldiers to protect the watering parties. Water is thus difficult to obtain, owing to the distance it has to be brought. Sheep are procurable.

There are so many reefs and dangers in the vicinity of Zeyla, that it is almost impossible to give a clear description of them.

Anchorage. The best anchorage for small vessels is on the N. side of the harbour, in 4 fathoms water, towards the S.W. point of Sadaldeen Island. Large vessels should anchor to the S.E. of Sadaldeen Island, in $4\frac{1}{2}$ or 5 fathoms water, about 3 m. N.N.E. of the town. It would be impossible to give any clear directions for sailing into Zeyla Harbour, there being no distinct

land-marks as guides : probably the eye is the best guide, the reefs being generally, on a clear day, distinguishable from the mast-head of a vessel : it certainly would not be safe to attempt the passage amongst the reefs at night, all having deep water close to their edges, whereby the lead affords no guide. (See page 115.)

The Mushah Islands are a group standing at the N. end of the Zeyla Bank, consisting of three islands and five small rocky islets, situated mid-way between the Essah and Danarkli coasts. The Islands were ceded to the British by the Sultan of Tejooreh, and taken possession of on 31st Aug., 1840.

Population. The Coast from Karangarit to Khor Kharab is inhabited by wandering parties of the Essah Somaulis : they are a powerful tribe, and said to be very numerous, and are much feared by the Danarkli tribe, inhabiting the opposite side of the gulf, who describe the Essah as a race of treacherous thieves and murderers ; they have, however, always been found to be an inoffensive people in their dealings with Europeans, except in a few instances, when probably some cause of offence was first offered by the stranger. It would be, nevertheless, prudent to be very cautious in all dealings with them, to avoid giving offence, especially in regard to their religious scruples. They are followers of Mahomet. Their arms are the spear and shield, bow and arrow, in the use of which they are said to be very expert, especially the latter, with which they shoot the elephant, ostrich, zebra, and indeed all kinds of animals ; the barb of their arrow is poisoned, with some vegetable composition, which, when fresh, causes death a few hours after wounding. They are rich in cattle ; bullocks, sheep and goats, are very cheap ; their camels are large, the price of a full-grown one is equivalent to 7 German crowns ; a horse is equal to three camels. The sea-coast is very barren, but the interior is said to be very fertile. The produce of the country is taken to Zeyla, where it is exchanged for coarse white and blue cloth, tobacco, &c., the Arab merchants of the town profiting greatly by the exchange. They do not know the value of money, but are very fond of ornaments, false pearls, beads, looking-glasses, &c. They are, generally speaking, a very tall race, the men averaging 6 ft. in height, and the women 5 ft. 8 in. to 5 ft. 10 in. Most of them are partial to red hair, and dye it that colour ; those who are not blessed with a good head of hair wear wigs made of sheep skin. They never wear turban or head-dress of any kind. A man who kills another in fair fight, is allowed the privilege of wearing an ostrich feather in his hair.

Tejooreh, the seaport of the Danarkli, is a village consisting of about 100 huts, and two stone buildings (one of which is a mosque), and containing about 500 inhabitants. It is governed by the chief of the Danarkli tribe, who assumes the title of Sultan. The natives from the interior assemble here annually, about the months of Jan. and Feb., for the purpose of trade, bringing with them slaves, gums, skins, ivory, myrrh, ostrich feathers, coffee, and a large supply of cattle. About 200 female slaves are exported annually. The above-mentioned produce is exchanged for coarse blue cloth, red cloth, salt, frankincense, brass, lead, zinc, &c., with which they return to Abyssinia. Kafilahs are passing to and fro throughout the year. There are about fifteen small trading boats belonging to Tejooreh, the largest of which does not exceed 70 tons burthen ; they trade with the ports of Aden, Mocha, Zeyla and Berbereh, and sometimes, though very seldom, go as far as Jiddah.

The harbour of Tejooreh is formed by a gap in the shore-reef which here extends about 200 yards off shore, immediately outside of which there is no bottom found at a depth of 40 fathoms. There are 10 fathoms water in the harbour, but the anchorage is exceedingly unsafe, with barely sufficient room for a vessel to swing. It is only during E. winds that the native boats can lie there ; during the S.W. monsoon it is extremely dangerous.

Tejooreh, Ambaboo and Obokh, are the only three villages on the whole extent of coast between Gubet Kharab and the entrance to the Red Sea. Occasionally scattered parties of the Danarkli tribe may be found, but they have no permanent villages ; it is when pasture is scarce in the interior that they drive their flocks down to the coast.

The Coast from Gubet Kharab to the entrance of the Red Sea is inhabited by the Danarkli tribe, whose territory extends inland to the borders of the kingdom of Shuah. They probably exceed 5000 in number, and are sub-divided into several smaller tribes, viz. : the Abd-Ali, the principal, to which the Sultan belongs ; the Abli ; the Debenk ; and the Rookbeh. Their religion is Mahomedan, but they are not strict observers of their creed. They are all armed with spears, shields and creeses, some few have swords, and near the coast a few have fire-arms. Opinion seems to be divided as to the character of these people ; by their neighbours they are held in great disrepute, being considered cruel, treacherous and inhospitable, in the same manner as they themselves hold the Essah Somaulis to be murderous thieves. Europeans who have visited the coast have always been received with great civility, possibly owing to their being armed ; but the

probability is, that if treated kindly, and their prejudices respected, they in return will act civilly.

Just outside Gubet Kharab, and on the Danarkli coast, are some ruins; and below the H. W. mark is a hot spring issuing from beneath the rocks; at H. W. there is no sign of it, but at L. W. it is so hot as to instantly destroy crabs and other fish thrown into it.

Obokh, the village which the French purchased a dozen years ago, lies about 2 leagues to the W. of Ras-al-Beer. Good water is here procurable at all seasons of the year.

ARABIAN COAST.—**Ras Bab-el-Mandeb**, or the Cape of the Gate of Affliction, the S.W. extremity of Arabia, is a prominent Cape; its highest peak, **Jebel Manhali**, is 865 ft. above sea, thence it slopes to the S., and terminates in a low point on the sea. Off the extremity of the Cape numerous rocky points project about $\frac{1}{2}$ m. from the shore, which form shallow bays, affording shelter to boats and small vessels; and here the traders from the opposite coast of Africa land their sheep, and drive them to Mocha, to avoid a tedious voyage back against S. winds.

Ras Arrah, the S. point of Arabia, is a low sandy cape with dangerous rocky patches at 3 m. off shore. Several vessels have been wrecked here and plundered. The natives on this part of the coast should be avoided, being of a hostile and ferocious character. There is excellent shelter from E. winds under **Ras Amran**, which cape forms the E. boundary of the territory of the **Subeihi** tribe. These people, though numbering about 12,000 persons, are little known; their general character is, that they are suspicious of strangers, revengeful and treacherous.

Jebel Hasan is a peninsular granite mountain, not very unlike to that of Aden, and bordering **Aden Back Bay** on the W. The land to the N. of it is low, and a deep inlet, called **Khor Biyar Ahmed**, or **Seilan**, extends for 3 m. to the W., almost insulating the promontory. **Biyar Ahmed**, a small fort and village, is situated about 3 m. from the beach, and contained (in 1836) about 250 inhabitants; it is the residence of the chief, or sultan, as he is called, of the **Akrabi** tribe. About 2 m. to the N.E. of **Biyar Ahmed** is the village of **Seilan**. The territory of the **Akrabi** tribe does not exceed 20 square miles, with a population of about 600 males; they are a treacherous race, and are not to be trusted: their territory is bounded on the N.E. by the **Abdali** and **Haushabi**, and to the W. by the **Subeihi** tribes.

The chief produce of the country is *jowari* (millet), of which much is exported.

ADEN, or AHDEN, has become of increased importance since the Suez Canal was opened. Owing to several wrecks having occurred on this coast, the British Political Authorities here have entered into Treaties with the Arab Chiefs to respect wrecked vessels, their crews and cargoes. Aden is situated in the territory of the **Abdali** tribe, which is said to number about 10,000 souls, who are not friendly towards Europeans; it is not safe, therefore, to land on the W. shore of the W. or Back Bay. The religion of the **Abdali** tribe is Mohammedan, and they are, apparently, very strict observers of their creed.

Trade. Aden was declared a free port in 1850, since which it has engrossed nearly the whole of the coffee trade formerly enjoyed by Mocha. The following statistics, from official sources, will serve to prove the increasing importance Aden is assuming:—

Total value of trade from 1843 to 1850, including exports and imports	-	-	-	-	£1,309,558
Ditto from 1850 to 1857	-	-	-	-	4,219,734
In the one year ending 1858, the total value of trade was	-	-	-	-	1,145,550
In the year 1872, the trade was greatly increasing.					

The principal articles of export are coffee and honey; imports chiefly coal, cotton goods, sheep, malt liquors, wines, spirits and sundries. (See **ADEN**, page 31, and in Chapter X.)

CHAPTER VIII.

RED SEA—AFRICAN SIDE—GULF OF SUEZ.

RAS SEJARN—ASSAB BAY—RAS RUKMA—ABELLAT—RAS SHUKS—HOWAKEL—ANSLEY BAY—MASSOWAH—
—DHALAC BANK AND ISLANDS—SUAKIN—MUSAHMROO—RAS ROWAY—ELBA CAPE—ST. JOHN'S—
RAS BENASS—DÆDALUS SHOAL—COSEER—THE BROTHERS—JAFFATAIN—SHADWAN—JUBAL—
ZEITEE—TOOR—GHARIB—ZAFARANA—SUEZ—WINDS—CURRENTS—TIDES—ARAB WORDS.

(VARIATION AT RAS SEJARN, $4\frac{1}{2}^{\circ}$ W.; AT MASSOWAH, 5° W.; AT JUBAL AND SUEZ, $5\frac{1}{2}^{\circ}$ W.)

Ras-al-Beer. As the Gulf of Tejooreh makes such a break in the African coast, it is convenient that a description of the African side of the Red Sea should commence at Ras-al-Beer, the N. cape of that Gulf, and 40 m. due S. from Perim Light. The cape is low and sandy, difficult to distinguish at night, and said to be deep-to. High land stands back about 7 m.; mangrove bushes and brushwood cover the intervening plain. This portion has never been surveyed, but is reported free from all danger. The French have lately purchased **Obokh**, a village about 2 leagues W. from Ras-al-Beer, where anchorage is found in a gap between reefs, about $\frac{1}{2}$ m. from shore, only open to S.W. winds. The entrance is nearly 2 cables wide, but the harbour-area though deep (15 fathoms) is of small extent.—(See further remarks at page 115.)

Above Ras-al-Beer the same low sandy coast stretches N., slightly convex, for 15 m.; then high table-cliffs come close to the sea for 4 or 5 m. to Jebel Jarn, with a low shingly and sandy shore 12 m. onward to Ras Sejarn. Above the table-land of Jebel Jarn, the soundings are a good guide; 20 fathoms at about 3 m. from land, 10 fathoms at less than 1 m. off; and the depth is less than 10 fathoms between the W. Brother and Ras Sejarn. Sailing vessels on this coast, not wishing to lose ground, might conveniently make use of the W. Brother as a breakwater, by anchoring under its lee in 7 or 8 fathoms, in either S. or N. winds; but the tides are rapid and irregular.

The Brothers, or Jezirat Sabah, are six rocky islets, scattered from $2\frac{1}{2}$ to 7 m. E. of Ras Sejarn. The W. one is about 200 ft. high. The N.E. Brother is largest and highest, 350 ft., visible in clear weather more than 20 m.; in lat. $12^{\circ} 28'$ N., lon. $43^{\circ} 23'$ E., and it stands 11 m. S. from Perim Light.

Ras Sejarn is an elevated rocky cape on a projection of the Abyssinian low coast, and the S. point of Red Sea entrance, in lat. $12^{\circ} 28'$ N., lon. $43^{\circ} 16'$ E., bearing S.W. by S., and 12 m. from Perim Light. Its peak, Jebel Sejarn, is volcanic, about 380 ft. high, and like a haycock. The peak is isolated, there being no hills within 5 m. to the S. and to the W. The coast is low and sandy for more than 30 m. to Ras Sintuar. The little bay to W. of Jebel Sejarn is a swamp with mangrove bushes; off it, and bearing N.N.W. from the peak at the distance of $1\frac{1}{2}$ m., are two rocks, about 7 ft. above water, with depths of 20 fathoms $\frac{1}{2}$ m. outside them, and a passage with irregular soundings between them and the main. Between these rocks and Doomairah the soundings are deficient, though apparently regular.

Jebel Doomairah is the high peak of an islet which lies $\frac{1}{2}$ m. off the sandy coast, 18 m. from Sejarn. A shoal (with little more than 12 ft.) lies 1 m. to N. of the islet; and 8 m. further at a prominent part of coast a sunken fringing reef commences, extending for nearly 10 m. in a convex course to **Ras Macawa**, a low woody island, which is 5 m. N. of Ras Sintuar, the low and swampy E. cape of Assab Bay.

Panther Shoal, in lat. $12^{\circ} 56'$ N. lies 5 or 6 m. to E. of Ras Macawa, having less than 3 fathoms. Another patch of 5 fathoms, lies 5 m. to N.W. of this; and a more minute search might find others. This part of the African coast had better be avoided.

ASSAB BAY is the space with islands and reefs extending to Ras Loomar, which is 15 m. W.N.W. from Ras Macawa. Its outer detached reef is about 8 m. long, having an islet near each end; **Jezirat Diloose** at the E., and **Jezirat Fartmar** at the W. There is a passage into the Bay between Diloose and Ras Macawa, but the principal channel is by Ras Loomar, avoiding the 2 fathom shoal which lies about 2 m. W. of Fartmar, and another shoal (not on the charts) said to

lie a little to N. of that island. The soundings inside Assab Bay are 6 and 7 fathoms mud. Wood may be procured on the islands. Jebel Marsoob, a small saddle hill, stands at the back of Ras Loomar, and 9 m. to W. of Fartmar.

Anchorage may be taken under the lee of Fartmar, which is a wooded island, in 8 or 9 fathoms, if overtaken by S. winds; with it bearing E.S.E., and less than 1 m. off. Then if the wind veer to N., the ship can run to S.E. along the reef, pass close to Dilcose, and haul out to E. and N.E. between the latter and Ras Macawa.

Tides. H. W. at F. and C. about noon, rise and fall 4 ft.

Sunnahboar Islet, in lat. $13^{\circ} 4' N.$, lon. $42^{\circ} 40' E.$, is a high pyramidal rock with a reef round it, $1\frac{1}{2}$ m. off the coast, and 8 m. W.N.W. of Fartmar. There is a narrow channel between it and the shore, with 5 and 6 fathoms. The soundings are regular towards Ras Bilool, but a ship should not shoal under 10 fathoms by night.

RAS BILLOOL is a prominent cape with a bay on its W. It is an oblong hill, steep and deep to the N., bearing N.W. $\frac{1}{2}$ W. and 21 m. from Fartmar Island. The bay affords protection from S. winds, but would be unsafe if the wind veered to N. There is a shoal bank of 2 fathoms at 4 or 5 m. W. from the cape. The iron-stone on Ras Bilool affects the compass.

RAS BILLOOL TOWARDS HARNISH ISLANDS. This space of sea, 25 m. broad, is studded with nearly a dozen islets, barren rocks, almost all volcanic. (See also Chapter IX.)

Sayel Islet, white and rather high, stands 6 m. to N. by E. of Ras Bilool; Harbee, a similar white rock, is 5 m. E.N.E. of Sayel. Between these islands and the main, soundings are obtainable with the deep-sea lead. The **Mah-heb-bakah Islets** are a group of three, standing from 13 m. to 15 m. to the N.N.E. of Sayel.

The **Haycock** is the central one of these three, in lat. $13^{\circ} 32' N.$, lon. $42^{\circ} 35' E.$, and between them and Sayel there are two other rocky islets. The channels amongst them are said to have no hidden dangers; but the charts exhibit few soundings, and the ships of the Abyssinian expedition (1868) considered it perilous navigation. Steamers should always pass between Harnish Islands and the Arabian shore. The outer rocky S.E. islet of the Harnish group lies E. by N. 5 or 6 m. from Sule Harnish, which is the S. high island. There is also a rock nearly midway between Sule Harnish and Mah-heb-bakah. A cluster of **Rocks**, some above water, others awash, lie out 6 m. to the W. from the S.W. end of Great Harnish, and about 7 m. to the N.N.W. of the Haycock; these have no soundings around them, but a depth of 45 fathoms at 5 m. to the W. of them; and thence to the shoals off Ras Ruckma there is a clear space of 20 m., with soundings gradually decreasing towards the African coast, where you get 10 fathoms at 3 m. from shore off Ras Ruckma, or Rukma.

RUCKMA ISLAND, about 150 ft. high, just off a cape of the same name, is situated 28 m. to the W. of Great Harnish. It is on the coast reef, a little bight in which (to S. of the Island) affords sheltered anchorage against N.W. winds, in 4 and 5 fathoms. To the N. of Ras Ruckma there is also good anchorage in moderate depths, with shelter from S. winds. In Ruckma Bay there are three or four islands; the S. one is largest, and about 200 ft. high. In the bight to S. of it, there are two wells where a moderate supply of brackish water may be obtained. There is no village hereabouts.

White Quoin Hill is the S. one of three white islets, about 80 ft. high, and rather more than 5 m. to N.W. of Ruckma Island. There is a rock awash at 1 m. to S.W. of White Quoin, and a passage with 7 fathoms between that and the main. Ras Sherayer, a barn-shaped brown volcanic hill, about 200 ft. high, stands on the shore, 7 m. to the W. of these islands.

JEBEL ABBELAT ISLAND, the N.E. point, in lat. $13^{\circ} 55' N.$, lon. $41^{\circ} 56' E.$, is volcanic, about 150 ft. high, the centre of the Abbelat group of three islands; the E. one called Sail Abbelat, or the Button Rock, is 40 ft. high and 10 m. to N.W. of the White Quoin group; the W. one is the Saddle, 200 ft. high. Jebel Abbelat is 42 m. W. of Jebel Zoogur, and the intermediate sea is clear of danger, with no soundings obtainable by passing ships.

Barn Rock, about 10 ft. out of water, situated 8 m. N.W. from Jebel Abbelat, is the N.E. danger of the Coordali Islets. It is 5 m. from the main land, and 3 m. off Jezirat Coordali, which is 150 ft. high; but the channel between them, though deep, is less than 2 m. wide. Ships must not attempt to pass between Coordali and the main.

Edd Village is in a bay 10 m. W. from Jezirat Coordali, and the same distance to S. of Coordomeat Island. It has a few small boats, and does considerable trade with Mocha in mats, rafters, ghee and goat skins. Good cattle may be had; but only brackish water, brought from a distance. Good anchorage is found at 2 m. off the village in 5 to 6 fathoms, with the square cape less than 1 m. to S.S.E., sheltered from S. winds. The soundings are regular into the bay. A sugar-loaf hill, 300 ft. high, stands 7 m. to S.W. of Edd.

COORDOMEAT ISLAND, in lat. $14^{\circ} 8' N.$, lon. $41^{\circ} 36' E.$, and $2\frac{1}{2}$ m. off the Abyssinian coast, is rugged and volcanic, 180 ft. high. S.S.W. of it, and 2 m. off, there are three small rocks, about 100 ft. high, situated upon one shoal bank, between which and the coast there is a narrow channel with 5 and 6 fathoms. In the rainy season, good water is found in a valley and water-course on the coast opposite Coordomeat.

The coast above Coordomeat has a general N.W. trend for 50 m. to Ras Shuks, with three prominences, called Ras Seerboot, Cussar and Ourata. The soundings regularly decrease towards shore from 30 fathoms at 10 m. off. Ships should not shoal under 10 fathoms.

Ras Shuks is a low cape, off which a reef extends 2 m. Soundings of 10 fathoms are found at 1 m. off the N. part of the reef, but on its E. side it is gradually shelving, and that depth is found 4 m. off.

Dangers. To the N. of Shuks, from 16 to 12 m., some shoals were discovered during the Abyssinian campaign of 1868; and to N. of these shoals, or 40 m. N. and N.N.E. of Shuks, there are other dangers mentioned under **Jebel Teer**, in Chapter IX. Therefore, a safe rule is to draw the danger line from Ras Shuks to Jebel Teer; unless bound for Massowah, Ansley Bay, or along the Abyssinian coast, inside all the Dhalac Islands, in which case a ship must take a pilot.

Amphilla, in a bay 16 m. to W. of Ras Shuks, is a small village on the verge of a sandy plain. There are several islands and shoals in Amphilla Bay; Barm-al-Haji, the outer island, is 8 m. to N.N.E. of the town, and 15 m. N.W. by W. from Ras Shuks. The anchorage is in 5 to 6 fathoms, about 2 m. to the W. of Durrumsus Island, which is 5 m. E. by N. of the village; this position is more than 1 m. from the main land, with another island to the W.

EASTERN OR INNER PASSAGE TO MASSOWA AND ANSLEY BAY.

Abyssinian Coast. On account of the many shoals to the S.E. of Dhalac Islands, a ship should keep the Abyssinian Coast on board and not shoal her water under 10 fathoms; all along shore danger being inside that depth till you reach Howakel. Off Shuks and Morah, when working to windward, either to N.W. or to S.E., she should keep between 3 m. and 12 m. off shore to avoid the Outer Banks.

Beach Hill is a round double-topped hill, bearing N.W. $\frac{1}{2}$ W., and 34 m. from Ras Shuks. A line drawn between them cuts through Barm-al-Haji outer islet and the N. point of Ras Morah, which may be taken as the general trend of the coast. **Omer Sarrij**, a low coral island, with bushes, lies $5\frac{1}{2}$ m. N.W. from Beach Hill. A shoal with 4 fathoms lies 18 m. to N.E. of Beach Hill.

Howakel Bay, 10 leagues to the S. of Dhalac Island, is a large bight more than 30 m. wide and 15 m. deep, containing numerous low coral islets and shoals, and two islands of some elevation, Howakel and Jebel Boker; the latter is 10 m. to W.S.W. of Omer Sarrij.

HOWAKEL ISLAND has a conspicuous peak on its centre, in lat. $15^{\circ} 9' N.$, lon. $40^{\circ} 14' E.$; its village is small, affording no supplies. Jebel Boker, 7 or 8 m. to the S. by W., forms a high oblong hill. About 2 m. to the E. of Howakel, there is a narrow low island, about 4 m. long N.E. and S.W. Between the latter and the E. end of Jebel Boker, there is another low island of less than half the above extent. **The Channel into Howakel Bay** is between these, on a S.W. course; then edge away to S.S.W. and to S., along the W. side of Jebel Boker, where you will get 4 fathoms, afterwards deepening to 5 and 7 fathoms, when you may anchor, with the extremes of Boker between N.E. by N. and S.E. by E.

Adjoos is a roundish and low coral island, about 1 league across, with a few trees and huts, to the N. of Howakel. To enter Howakel Bay from the N., steer in on a S.W. course between Adjoos and a small island W.N.W. of it; and then pass to the N. of all the islets, which lie to the W. of Howakel, towards the shore reef; this fringing reef must be coasted along till you are to the S. of the islets, then you may anchor in 7 or 8 fathoms, mud, about 1 m. to the S.W. of the W. islet. The N.E. extreme of Adjoos Island is in lat. $15^{\circ} 15' N.$, lon. $40^{\circ} 15' E.$; the nearest shoals of the Dhalac Bank are 5 leagues from this.

Larmoo Islet (5 leagues to N.W. of Adjoos), is low and surrounded by a reef, and lies 2 m. off the main land to the E. of Hurtow Peak. A rocky patch lies 2 m. to the W.N.W. of it. The channel between Larmoo and the Dhalac Islands is 3 leagues broad, and has soundings throughout. **Moosmaree Island**, on the Dhalac Bank, is equidistant 17 m., from both Adjoos and Larmoo.

Shummar Island, about 1 league to S.W. of Dhalac Island, is 10 m. to the N. of Larmoo, and 5 m. to E. by N. of the Asarkas; this forms the narrowest part of the Inner Channel. The little island **Enturah**, surrounded by a reef, is $7\frac{1}{2}$ m. to N.W. of Shummar.

ASARKA ISLANDS. Hurtow Island is off Hurtow Point, 12 m. to N.W. of Larmoo; and two small rocky islets stand to the N.E. of it, called the Asarka Islets, on the E. one of which a temporary light was placed in 1868, in lat. $15^{\circ} 32' N.$, lon. $39^{\circ} 55' E.$, to mark the entrance to Ansley Bay. From these islets the town of Dhalac Island bears N.E. by E. 6 m. off; and Enturah Islet is the same distance to N. The N. point of Hurtow lies about 2 m. to S.W. by W. of the W. Asarka, and a khor or inlet runs in thence a league to the S., with 7 fathoms shoaling to 3 fathoms; a fringing reef forms the W. side of this khor, with an island on its N.W. extreme, which is midway between Hurtow and Dissee Islands.

To enter Ansley Bay. A vessel may pass the Asarkas on either side, and find good anchorage between them. The fair channel between the Asarkas and Shummar Island (on the Dhalac side) is 4 m. wide, with soundings of 25 to 35 fathoms. After passing to the N. and W. of the Asarkas, a vessel should keep on a W. course, not shoaling under 10 fathoms, till all Dissee Island is seen; then steer for Dissee Peak, about a S.W. course, and anchor in 10 fathoms, off Village Bay, about $\frac{1}{2}$ m. to N.E. of the Peak, with a shoal about $\frac{1}{2}$ m. to the S. by W., and Quoin Hill open of the S.E. point of the island.

ANSLEY BAY, or GOOB DUCNOO, is a deep indentation of the Abyssinian coast, extending 10 leagues to the S. of Hurtow Point. Hurtow Peak, the culminating and central point of the Hurtow Headland, at 3 leagues to S. of that point, is equidistant from it, from Larmoo, and from Dissee Islands, and is a good land-mark; it is also called Mount Dulhi.

This Bay was used during the Abyssinian campaign of 1868 as the base of military operations. Shoals were then marked by temporary beacons now removed. The E. passage into the Bay is on either side of Centre-Bay Island, between Dissee and Hurtow Headland; then borrowing towards the latter because of the **Indore Rock**, (with only 6 ft.) about 3 or 4 cables off the S.E. point of Dissee Island; after passing that rock, a S. by W. course, for about a dozen miles, will take a vessel to Malkatto Point, near Zula, on the W., or Keedan shore, whence the British troops commenced their march.

Entering Goob Ducnoo from the N. Ansley Bay is quite exposed to N. winds. The entrance from the N. is past Massowah, where the water is all deep, 20 to 40 fathoms. Give a berth of at least 2 m. to the round Cape of Keedan, 3 leagues to S.E. of Massowah, where a 5-fathoms shoal has been found at $1\frac{1}{2}$ m. from the Cape (and there may be others); thence to Dissee Island, and up the Bay, all is deep water. The mountains on the W., or the Keedan side, are very lofty; **Jebel Keedan, or Geedan**, 13 m. to S. by E. of Massowah, is 2,700 ft. above sea, and only 6 m. from the shore of the Bay. To the W. and the S.W. of that peak, and at only 20 m. from the sea-shore, the mountains attain to three times that elevation.

Dissee, or Valentia Island, nearly 3 m. long N. by W. and S. by E., and $\frac{1}{2}$ m. in breadth, consists of a central plain covered with grass, and a number of hills around, with a few straggling trees. Dissee Peak (to the N. of which lies Village Bay, the watering-place) looks down upon the middle of the E. shore, and opposite Centre Bay Island, which stands about $1\frac{1}{2}$ m. to the E., half-way to the Hurtow shore. **Village Bay** has but a dozen houses. Water is procurable in small quantities from springs at $\frac{1}{2}$ m. from the beach. Plenty of bullocks, sheep and goats are at hand, but the inhabitants are not anxious to sell them.

A Sand-bank lies $6\frac{1}{2}$ m. to the N. of Dissee Island, connected to it by a narrow reef. This makes the E. entrance into Ansley Bay (past the Asarkas) the most handy for vessels coming from Mocha or Aden. The entrance from the N. is handiest for vessels coming from Egypt or Jiddah.

An extensive rocky ledge, with only 2 fathoms, lies from $3\frac{1}{2}$ m. to $2\frac{1}{2}$ m. to the W.N.W. of the above sand-bank, and vessels had better not try to pass between. From these rocks the bearing of Jebel Keedan is about S.W., and Dissee Peak about S. by E. The rocks bear from Massowah, E. $\frac{1}{2}$ S. 13 or 14 m.; therefore, in going from Massowah towards Mocha, a vessel should be careful to steer to the N. of an E. course (say E. by N.) for at least 15 or 16 m.; then S.E. by E. to pass between Shummar Island and the Asarkas.

MASSOWAH ISLAND, in lat. $15^{\circ} 38' N.$, lon. $39^{\circ} 28' E.$ (the N.E. Martello tower), is situated at the N. extreme of Arjeego Bay, and about 4 m. to the N. of Dohono, or Arjeego Town. The high land of Keedan forms the S. and the S.E. sides of this Bay. The Island is less than 3 cables wide, and rather over $\frac{1}{2}$ m. long, W.S.W. and E.N.E. Shoal water connects it with other low islands to the W. There are many water-tanks and graves on the Island; the W. half is occupied by the town, which is thickly inhabited to the very water's edge. Some mosques and the residences and warehouses of Banyan merchants, are conspicuous buildings. The bazaar has beef, mutton, fowls, and sometimes fish, ghee, jowari, dates and tobacco; a few vegetables sometimes. The trade is not great, and entirely carried on by small baghalahs, principally to Mocha or Hodeidah,

Jiddah and Aden. Since 1866 an Egyptian garrison has taken the place of the Turka, who formerly held Massowah. Consuls of both Great Britain and France reside here.

The harbour is along the N. side of the Island, having good anchorage in 7 to 8 fathoms. The entrance is only $1\frac{1}{2}$ cables wide, as shoal water extends nearly 2 cables to the N. from the Martello tower. The mid-channel course inwards is about W. by S., or steering for the S. end of Hor-al-Jarai, an island 3 cables to N.W. of Massowah town; when the E. end of Massowah Island bears to the E. of S. by E., you can begin to haul more to the S.W. for the anchorage.

THE GREAT DHALAC BANK AND ISLANDS.

The **Dhalac Bank** is that vast extent of shoal water, with Dhalac and numerous other islands and dangerous reefs, extending from 30 m. W. of Jebel Teer for a distance of 150 m. to N.W., or about half-way to Suakin. This Bank has not been thoroughly examined; and, as it has so many shoal spots with 3 fathoms and less, ships had better haul off, after getting a cast with the deep-sea lead.

Moghady, the S.E. island of the Dhalac Bank, in lat. $15^{\circ} 32' N.$, and lon. $40^{\circ} 50' E.$, is a high rocky islet, with others to the W. of it. Mashilgar, bearing S.W. by W. and 8 m. from it, is the S. high rocky islet, but Bolhessoo (*See* page 132), which is low and sandy, is the most S. island of all the Dhalac group, bearing S.W. by W. 13 m. from Moghady. Howakel Island is on the same bearing, and 23 m. from Bolhessoo, but the navigable channel along the African coast is only 15 m. broad, as there is a sunken rock at one-third of the way from the last-named islet.

REEFS AND SHOALS. Several patches, with 2 and 3 fathoms, have been found to E. of the above islets. The outer patch is 33 m. on a S.E. by E. bearing from Moghady, and it is also 33 m. to S.W. by W. of Jebel Teer. The **Shab Alli Reef**, partly dry, has its E. extreme at 13 m. off Moghady on a N.E. by E. bearing; and the Segarla Islands, sandy, low and bushy, stand to W. of this extensive reef, which lies between lat. $15^{\circ} 38'$ to $15^{\circ} 48' N.$ Segarla N. island, low and bushy, lies to the W. by S. of the N.W. end of Shab Alli reefs.

Caution. Vessels coming from the E., should be careful to avoid the Shab Alli reefs.

Bilhaha—another low sandy island, standing 20 m. to N.N.W. of Moghady, and 5 m. to N.W. of the N. Segarla—has a dangerous shoal projecting 5 m. N.E. from it; and there is a detached sunken reef at 9 m. to N.N.E. This last and other neighbouring shoals warn the mariner off this dangerous Dhalac Bank.

Hooateb, another low sandy islet with bushes, stands 9 m. to N.W. of Bilhaha, and thence the islands lie back more to the W. till you reach **Mahoon Island**, in lat. $16^{\circ} 4' N.$, and lon. $40^{\circ} 10' E.$ From Mahoon they lie in a N. direction, with plenty of off-lying banks and shoals. Untoentore, or **Entah-entoor Island**, lies about 17 m. to the N. by E. from Mahoon. Captain Moresby says, "there is no channel for ships across the Dhalac Bank to the S. of Untoentore."

HARMEEL ISLAND (the N.E. point), in lat. $16^{\circ} 34' N.$, lon. $40^{\circ} 10' E.$, the N.E. island on the Dhalac Bank, has its N.E. end at 30 m. due N. of Mahoon. It is a large island, about 5 m. in length N. and S., of sand and coral, low and woody. A bank of soundings extends around it, off the N.E. point for 3 or 4 m.; off the S.E. side for 8 m., where there is only 3 fathoms. A detached shoal lies 5 m. to the N.W. of Harmeel, and plenty more to the W. between it and Difnain Island, which bears W. by N. 50 m. from Harmeel. **Romea Island**, at 5 m. to W. of Harmeel, is small, sandy, and covered with wood. A good channel between it and Harmeel.

Difnain, a low coral island, in lat. $16^{\circ} 38' N.$, lon. $39^{\circ} 17' E.$ is the N.W. island of the Dhalac Bank. It stands 8 m. off the Abyssinian coast. Vessels going to Massowah from the N. part of the Red Sea, may conveniently take this N. Inner Passage, keeping between 3 and 6 m. off the main land. Vessels should make the coast at the 17th parallel of lat., as there are so many shoals on the N. part of the Dhalac Bank. The most N. shoal (as yet known) with 3 fathoms, lies 36 m. to N.E. of Difnain, another lies 35 m. to the E.N.E.

Suratoo or Irahtoo Island, with some small peaked hills on it, stands about 17 m. to the S.W. of Harmeel. **Nora Island**, low and sandy (the next largest to Dhalac) **Wahalej** and others, lie between Harmeel and Dhalac. Vessels should not go into this labyrinth of islets and shoals, without large-scale charts and Captain Moresby's *full* directions; and with an Arab pilot.

COAST CHANNEL FROM THE N. TOWARDS MASSOWAH.

The Islands and Shoals marking the E. side of the Coast Channel are **Difnain**, the N. island, then **Andesilee**, 6 or 7 m. further to the S.; some shoals then occur, and a space of 9 m. without soundings, which had better be avoided; then more shoals occur till you come to **Sail Badesara**.

Islet, which is 27 m. to the S. of Difnain, and about 9 m. from the main land. Do not approach this islet nearer than 3 m. off its N.W. side, nor pass between it and Haraht.

Haraht is an island 8 m. long N. and S., standing 2 m. to S.S.E. of Sail Badeera; its S. point is 25 m. due N. from Massowah. All the shoal water for 9 m. to the N. by W. of this island is called **Haraht Reefs**; when abreast of which, vessels had better keep within 5 or 6 m. of the African shore. A small sandy island, called **Laboo**, lies 1 m. off the S.W. end of Haraht, this is less than 8 m. from the main. To the S.E. of it, at 7 m. and 11 m. off, there are two low sandy islets, with a few bushes, **Dulbahoot** and **Dahrel**; then, at 2 m. to the E. of the latter, stands **Dohool Island**, which is about one league in diameter, having some dome trees and a village with a mosque on its N.W. side.

Durgaum and **Darghelee** are two low sandy islets, with a few small trees or bushes, standing midway between Dohool and **Enturah**. (See page 129.) This last stands 1 league off the W. side of Great Dhalac Island. Vessels should not attempt to pass between them.

DHALAC KEBEER, or GREAT DHALAC ISLAND, which lies only 7 m. to the N.E. of Hurtow Point (page 130), has a sort of star-fish shape, thus formed by three or four inlets converging towards its centre. There are seven towns or villages on the Island; Doobelloo, Derboshat, Salat, Dhalac Kebeer, Goobanee, Cumbesber and Memlah. **Dhalac Kebeer**, the principal town, is at the S.W. side of the great island, which is a little short of 6 m. to the N.E. of the Asarka Islets; this town has four mosques and two burial grounds; about 2 m. to the N.W. of it, there are near the beach a number of wells, surrounded by an embankment. During the rains, fresh water is found in pools; some parts of the Island afford a supply of good grass. The only beasts seen were asses, goats, sheep and numerous antelopes. To the N. of Dhalac Kebeer Town, there lies an extensive lake, called **Gubet Segeer**, with depths of 40 fathoms in it; the narrow mouth, which is 5 m. or 6 m. to the N.N.W. of Dhalac Town, has 6 and 7 fathoms in it. Boats obliged to procure water at Dhalac, can approach that place within 1 m., if the ship be taken into Gubet Segeer and anchored off the S.W. shore, about 3 m. due N. of the town. Tides run with rapidity in the entrance to Gubet Segeer, and may assist a ship in getting in or out; otherwise she needs a fair wind, there is no room to tack. The rise and fall was stated by Captain Court (Lord Valentia's voyage, in the *Panther*) to be 9 ft., but this is most improbable.

Doobelloo Town, about 12 m. to the N.E. of Dhalac, and on the N.E. side of the Island (an inlet runs up past it to Derboshat), has the principal trade and a better appearance than any of the other villages. The principal sheik of the island resides at **Derboshat** 4 m. to the S. of Doobelloo, those of the different villages being subordinate to him. The trade of Doobelloo is principally with Loheia and Gheesan, whence they import jowari and dates, giving in return the produce of the pearl banks, such as fish, shark-fins, the horny part of shell-fish, turtle-shell and pearls. They preserve their water in tanks, which are filled during the rainy season.

Enturah Islet (page 129), stands off $3\frac{1}{2}$ m. to the S.W. of Gubet Segeer; and between this Islet and Dhalac Kebeer, the Dhalac reef projects $2\frac{1}{2}$ m. from shore, narrowing the passage between it and the Asarkas Islets to a breadth of 4 m.

Shummar Island stands nearly 1 league to the S. of Dhalac Kebeer shore; the passage between seems safe and very deep, but had better be avoided as not well known. **Moosmaree**, a high rocky island, lies 16 m. to the E. of Shummar. No vessel should go to the E. of these islands without an Arab pilot. **Sail Amber Islet**, low and sandy, lies 4 or 5 m. to the E. by S. of Moosmaree, and 18 m. to the N.W. by W. from Bolhessoo.

BOLHESSOO, the most S. of all the Dhalac group, stands 18 m. to S.E. by E. of the E. end of Dhalac Island, and in lat. $15^{\circ} 25' N.$, lon. $40^{\circ} 38' E.$

Numerous shoals have been discovered in the space of sea, extending 80 m. to the S.E. and the E. of Moosmaree. Therefore (as stated at page 129), a ship should keep the Abyssinian coast on board if going to Massowah.

To describe what is known of the numerous islets, reefs and shoals, at the S.E. end of the Dhalac Bank, would be of little use to navigators. We can only warn all vessels to avoid them. If compelled to go there, they should have the large scale Admiralty charts and a pilot.

ABYSSINIAN, NUBIAN AND EGYPTIAN COASTS.

(VARIATION OF COMPASS HALF A POINT, W.)

Massowah has been described (at page 130). The mountains at 15 m. or 20 m. to the W., and at 40 m. to the N.W., are lofty, but they stand many miles from the sea-coast.

Khor Dahaleah, only $1\frac{1}{2}$ m. to the N. of Massowah, is a very similar anchorage, and larger.

The coast-line above this place trends to N. by W. for 10 m. to Ras Haroob, and thence about N.N.W. 28 m. to **Coobak**; it is low and sandy in some places, with mangrove bushes and salt swamps, where the natives procure salt; low barren sand-hills lie at the back of the swamps. Soundings seem pretty regular along this shore, and they are not too deep towards the islands. Do not shoal under 10 fathoms towards the main land.

Mersa Ebrahim, a small boat anchorage, lies 16 m. to the N. by W. of Coobak; and, at 8 m. further stands **Gundaleet Islet** in lat. $16^{\circ} 38' N.$, lon. $39^{\circ} 8' E.$; this is abreast of **Difnain**, the most N. of the low coral islands of the Dhalac group, from which it is distant $8\frac{1}{2}$ m. Another small boat anchorage, called **Mersa Moobarak**, lies midway between Ebrahim and Gundaleet. The coast reef hereabouts extends about 2 m. from shore.

Garna Duff, properly **Karn Ahduf**, is a slight projection of the coast, about 18 m. to the N. by W. of Gundaleet; this coast is all low and sandy. **Jebel Karn Ahduf** is a sand-hill 4 m. from the beach, with a bluff to the N.

From Garna Duff the coast runs N. by W. 29 m., under some high peaks; then N. by W. $\frac{1}{2}$ W. 16 m. to Serabar, all low barren sand, backed by high mountains in the distance. At 4 m. to the S. of Serabar is that part of the coast called **Rarret** and **Gubroo Sheikh**. **Mundaloo** is 7 m. N.W. by N. of Serabar: there is at this place a very small bay between the points of the coast-reef, where boats anchor. The land hereabout is low and swampy, and a little within the beach is a salt plain, where the Bedouins come down with their camels to procure salt.

Ras Casar, bearing N.N.W. 18 m. from Mundaloo, is a projecting point of land, at $1\frac{1}{2}$ m. to the S. of which is a bight or bay, called **Brassy**. The shore-reef about here projects nearly 2 m. off the coast, with breakers; and within the outermost part between the patches are 3 or 4 fathoms, where buggalows anchor. The coast is low and sandy, backed by high land. **Aboo Yahbis**, a low bushy cape with small white sand-hills, is $5\frac{1}{2}$ m. to N.W. of Ras Casar; from thence the coast trends away to the S. and N.W., forming small bays of shoal water, with islands in front of them, upon the coast-reef.

SAIL BAR, a small rocky island, lies $1\frac{1}{2}$ m. to N.W. of Aboo Yahbis: to the N.W. of it there is a rather large, but low bushy island, for which we have no name. The next is a small sandy island, with the highest part to the E., called **Ras Abeed**: it is separated from the main by a narrow channel of shoal water, affording protection for small craft, there being 2 and 3 fathoms in it. To the N.W. of this island is **Eree Island**, about $4\frac{1}{2}$ m. in length, N. and S., of very irregular shape, measuring nearly 14 m. This Island is low and sandy on the E. part, but on the W. part are the ruins in coral rock of the ancient Ptolemais Theron: the highest part is a mound of ruins which is visible from Ras Abeed, from whence it bears W. 3 m. Many tanks were seen there. There is a bay formed on the W. side of the Island, with 3 and 4 fathoms, mud, the former depth being pretty close to the Island. The entrance into this bay is along by the N. side of Eree, passing between the W. extreme of that Island and Ras Farajin to the N.W. of it; but there are only 2 and $2\frac{1}{2}$ fathoms in the entrance, on a bar formed on a continuation of the coast-reef from Ras Abeed, whence it runs along the E. and N. sides of Eree, and then off from its W. point to the islands of Khor Nowarat.

Quoin Hill is a near range of sand-hills 4 m. from the beach; Round Hill is to the W. of it, and about 6 m. from the beach; Sugar-loaf is a rugged steep hill in the first range of high land.

A Group of low coral Islands lies fully 40 m. off the coast from Ras Abeed to Suakin. These have been alluded to (Section I., page 29) as the Mussarmroo (Musahmroo) group, and more fully described at page 136.

KHOR NOWARAT is, without exception, the finest bay in the Red Sea; its breadth from Ras Istye to Ras Farajin is $4\frac{1}{2}$ m., and it is nearly the same in depth from Farajin Island; but the island of Badour is in the centre of it, so that a channel is formed round that island. In the outer part the soundings are from 4 to 6 fathoms, mud; in the inner part, where vessels anchor, there are 4 fathoms towards the island, gradually decreasing to 3 and 2 fathoms near the main. The outer part of the bay is bordered by a chain of low sand and coral islands, which effectually keep out the swell of the sea; they are formed upon coral reefs, and there are a few bushes or small trees on some of them. The most N. of these islands is Jezirat Gooban, a low coral island; the most elevated of the whole to the S.E. of it are **Hadjar Islands**, three in number, and situated upon one reef. A little within them is Jezirat Shetevo, and to the S.E. of it an island nearly 3 m. long, called **Farajin**; these two are also situated upon one reef, which is connected to the coast-reef off Ras Farajin, upon which are two or three other small islands. There are also some small islets between Badour and Farajin Islands, and a shoal easily discernible just to the W. of Shetevo Island; and two small islands in a swampy bay to the W. of Ras Istye, or Es-saj.

Badour Island, or **Ahgeeg Kabeer**, is $2\frac{1}{2}$ m. long, and $\frac{1}{2}$ m. broad, formed of coral rock, with

a low sandy plain on the W.; on the E. part it is rather woody. The village of Badour is a small place, consisting of about sixty huts, and a square stone mosque, and a little W. of the town, on the margin of the Island, opposite the ship's anchorage, is a small tomb. About $\frac{1}{2}$ m. from the village are some stone tanks, cut out of the solid rock; but most of the water found in them was very brackish, nor could better be found either on the Island or the main.

Directions. Sailing in to Khor Nowárat, the only proper entrance for ships is between Gooban Island and the Hadjar chain to the S.E. of it; then round Ras Istye and steer S.W. by S. to clear the shoal off Shetevo Island; then in passing round the W. point of Badour Island, give a small spit off it a berth, and anchor in 4 fathoms to S.W. of the village.

There is a channel between Farájin and Hadjar islands, through which the *Benares* sailed; but it is very narrow, and cannot be recommended for ships, there being only 16 ft. in some parts. Small vessels proceeding from Khor Nowárat to the S. find this a convenient channel during N. winds; also, when coming into the Khor from the S. with S. winds, as it shortens the distance in and out, as well as time in working through the N. channel. Fishing-boats find a channel in from the S.E., by crossing the reef between Farájin Island and Ras Farájin.

There are no supplies to be obtained here; so that the only advantage to be derived from this excellent harbour is the protection it affords in stormy weather. The coast surrounding the bay is low and sandy, and the high land approaches within 5 m. of the coast; perhaps some spot might be found where wells could be dug, and a sufficient supply of good and wholesome water be obtained.

Ras Shakul is 3 m. to the N.W. of the Hadjar Islands, and **Ras Ahsees** is 12 m. further to N.W.; the coast between forming a deep bay, with soundings of 12 to 6 or 5 fathoms. From 2 to 3 m. W. of Ras Shakul are the two **Amarat Islands**; they are low and sandy, with a few bushes, situated upon a coral reef; a small islet lies on it also to the S. of the E. island, and a little beyond it a rocky patch. Between these and the cape-land is a passage to **Ahgeeg Segeer**, a small island in the bottom of the bay, bearing S.W. by W. $6\frac{1}{4}$ m. from Ras Shakul. This island, with a small tongue of land to the W. of it, forms an anchorage in 5 or 4 fathoms, and at $\frac{1}{2}$ m. from the beach are some wells dug in the sand, containing brackish water in the dry season. About 1 m. from the beach, in the direction of Quoin Hill, are some remarkable ruins in a straight, narrow line, $1\frac{1}{2}$ m. in length, and from 20 to 60 ft. wide; they are situated upon raised ground, sloping from the centre to either side. About $5\frac{1}{2}$ m. to the N.W. of the tongue of land at Ahgeeg Segeer is a similar one running to the N., with a reef, on which are some islets, and another to the E. of it; this place is called Barrat Dodom, it is $7\frac{1}{2}$ m. to the S. of Ras Ahsees.

The Coast from Ras Ahsees runs 14 m. to N.W. by W. to a projecting point of the coast, and from thence concave $11\frac{1}{2}$ m. to Ras Mucdum. The land all along the coast from beyond Ras Ahsees is a very low sandy shore, with a layer of soft mud beneath it, and continues of the same description several miles inland; but after passing the above-mentioned projecting point of the coast, there are a few sand-hills. A mile or so to the S. of Ras Mucdum is Trikatatah, off which place there is anchorage in 6 fathoms inside a reef, which bears from it N.E. $\frac{1}{2}$ N. about 500 yards. This part of the coast is low barren sand, full of salt water swamps, and some parts covered with bushes, but no fresh water known to be procurable. Within a narrow woody neck of land is a deep bay of shoal water, the entrance to which forms a small bay for boats; but ships must anchor to the E. of this narrow neck of land, between it and a breaking reef, called **Gad-al-Kanasha**, where they will have 6 fathoms. About 4 m. S.E. from Ras Mucdum is a rocky spot, called **Gad-at-Tromba**.

Ras Mugda is 3 m. to N.N.W. of Ras Mucdum. The nearest of the several islands, that lie some 40 m. off the coast, to the N.E., and the N. of Khor Nowárat, called **Tellah-tellah Segeer**, bears E. by N., 15 m. from Ras Mugda. From Ras Mugda to Suakin the direct course is about N.W. 32 m.; but the coast between forms a bight, encumbered with reefs and shoals. Close to the E. of Ras Mugda is a shoal patch, and close to the N. of it are some islets. A projecting point, consisting of sand-hills, lies 5 m. W. by N. from the Ras, the coast between forming a bight. From this projecting point to Mersa Sheikh Saad is N.W. by W., 13 m., the coast also forming a bight, in which is Burkat Island, and another to the W. of it; the former is situated on the shore-reef, which extends from Ras Mugda towards the projecting sandy point, whence it suddenly turns off to N.E. 2 m., forming a point, and thence to W., with some islets on it, 7 m., whence it suddenly turns in S.S.E., and forms a bight close to the shore. From thence it runs up along the coast to Suakin, extending from $\frac{1}{2}$ m. to $1\frac{1}{2}$ m. from shore all the way, having, however, some breaks in it. The first of these breaks is 7 m. N.N.W. from Mersa Sheikh Saad, and is called **Mersa Hadoo**; and 2 m. further is another, called **Mersa Likak-Hindi**; to the N. of the latter and $3\frac{1}{2}$ m. off, is **Mersa Entabeel**, which is 7 m. S.S.E. of Suakin.

Al Shubuc is an extensive reef with some islets on its fringe. It extends from near Ras Mugda to the distance of 17 m. to W.N.W.; a deep-water harbour is formed inside it, the entrance being by Mersa Sheikh Saad, and it has 10 fathoms in the narrowest part of the channel. Entrance may also be taken off Ras Mugda. **Sumar Islet** is on the N.E. side of Al Shubuc Reef, and some **sunken reefs** lie about 6 m. to N.E. by N. from Sumar; but **Two Islets standing on a Reef**, only 2 m. from these sunken dangers, form good marks to avoid them. These islets are 9 m. to the N. of Ras Mugda.

Gad Hogeet is a reef, about $1\frac{1}{2}$ m. off the fringe of Al Shubuc, and 6 m. to the N.N.W. of Ras Mugda.

Gad Etwid Reefs are a cluster of shoals and islets, lying off the coast, between Al Shubuc and Suakin, commencing about $1\frac{1}{2}$ m. off Mersa Hadoo, and extending 5 m. to the N.E. by N., where a dry sand-bank (Gad Etwid) marks their N.E. extremity. The channel between these reefs and Mersa Hadoo is 1 m. broad, with 10 to 25 fathoms water. From the sand-bank, the cluster embracing the dangers extends for 5 m. to the S. by E., leaving a clear channel, 3 m. broad, between it and Al Shubuc Reef.

Etwid Island (a small islet with a larger one at $\frac{1}{2}$ m. further S.) stands on a reef about a league to the E. of Gad Etwid Sand-bank. There are plenty of reefs in the vicinity, and to the N.W., half-way towards Suakin. The S.W. reef (called **Shab Tweel**) of the group of islands and reefs which lie many miles off shore abreast of Suakin, bears N.N.E., and is distant $5\frac{1}{2}$ m. from Etwid Island.

SUAKIN. The Khor of Suakin is bordered by a reef of rocks, between which, in the narrowest part, it is about 150 yards broad: its depth is 2 m. The lat. of the island, by Captain Pullen, R.N., $19^{\circ} 7' N.$, lon. $37^{\circ} 20' E.$ In the entrance of the Khor there is a depth of 21 fathoms, mud; and it is open with the S. mosque bearing S.W., when Warantah Hill will bear about W. The soundings throughout the channel are mud, and the depth decreases gradually on approaching the town: the widest anchorage is to the N. of Sheikh Abdallah tomb (on an island 2 cables to N. of Suakin), in 6 to 8 fathoms, mud; but that off the town, between the landing-place and S.E. part of the above island, is the most convenient. There is a ruined tower on the N. side of the entrance. The town of Suakin is built of madrepora, and is situate upon a small island of the same name; the houses are very small, seldom containing more than one room, though some few have also an upper room with a verandah; for supplies, it has to depend upon Ulgaff, situated on the main at the bottom of the Khor. The water between them is shallow, and there is constant communication between the places throughout the day by ferry boats. Ulgaff, or El-Kaff, is much larger than the town of Suakin (Swakin,) and consists of grass huts surrounded by compounds (enclosed courts); it has a bazaar, in which a few cattle may be had occasionally; but firewood, milk, ghee, coarse mats, jowari, grass and butter, were the principal articles; fish is very scarce; good water can be obtained at a moderate price; it is brought from about a mile beyond the town on donkeys.

The Khor lies in a S.W. and N.E. direction, and the general winds are either land and sea-breezes, or blow in a line with the coast, inclining off the land at night, and from seaward early in the forenoon. By weighing at sunrise, the *Palinurus* was always able to lie close-hauled out of the Khor, keeping the weather-side on board; and by so acting, she has sailed in and out four times; in Jan., March, and June. The reef bordering the Khor is easily seen, and there is a rock or two above water at the entrance.

Warantah is the high land just to the N.W. of Suakin: it is the largest conical hill in the first range, and forms with two small knobs when seen off the place. Farther to the N., off Mersa Kuwai and Shab Damah, its summit forms the lower section of a truncated cone; and from Jezirat Abdullah the whole of it appears in the shape of a neat's tongue.

Approaching Suakin from the S., after passing between Tellah-tellah Segeer Island and Ras Mugda, steer for the **Two Islets** (nameless at present) in lat. $18^{\circ} 54' N.$, lon. $37^{\circ} 46' E.$; when between them and Sumar Islet, steer W.N.W. for 6 m., then to W. for nearly 12 m., which will put you off Mersa Hadoo, having passed between Al Shubuc and Gad Etwid Reefs. From Hadoo, you may coast along to the N., along the shore-reef, keeping a good look-out from mast-head, whence the reefs and patches may generally be seen in the day-time.

The numerous shoals off shore along this coast, and the probability of the existence of many more in unsurveyed parts, renders the **Inner Channel** along the fringing reefs of the coast to be the preferable navigation. The S. entrance by Ras Mugda may be taken on a clear day, if the large-scale Admiralty Charts are on board.

The principal part of the Outer reefs and patches may generally be seen in the day, if a good look-out be attended to; but the chart will show that the Inner Channel is preferable.

ISLANDS OFF KHOR NOWARAT AND SUAKIN.

Having given a description of the reefs and dangers near the coast, and forming the Inner Channel to Suakin, we now return to the S., and describe the islands, shabs, &c., lying off the coast, between the parallels of $18^{\circ} 20' N.$ and $19^{\circ} 25' N.$

Dahrat Abeed is the most S. of these islands, in lat. $18^{\circ} 21\frac{1}{2}' N.$, lon. $38^{\circ} 46' E.$, and bearing N.E., distant 20 m. from Sail Bar Islet. **Suffenot Shoal**, a patch with 1 fathom only, lies 4 m. to N.N.E. $\frac{1}{4}$ E. of Dahrat Abeed. It is very likely that others, equally dangerous, lie amongst these islands, which (in Section I., page 29, and again at page 133) we have spoken of as the Mussarmroo (Musahmroo) group.

Gurb Mioon Reef, the N.E. extreme, bears about N.E. by N., 12 m. from Dahrat Abeed: it is upwards of 1 league long, W. by S. and E. by N.; the islet of Gurb Mioon stands at its W. end; and further to W., nearly 2 m., is **Mioon Islet**, at 4 m. to W.S.W. of which stands **Derakkah**, surrounded by a reef, and no bottom at 80 fathoms close to the N. of it. **Eddom Sheikh**, also surrounded by a reef, with 90 fathoms close to it, lies nearly N. $6\frac{1}{4}$ m. from Gurb Mioon, and 3 m. to the W. of it is **Gurb Abi Isah**. Three miles N. of Mioon is **Dahrat Duggelet**, surrounded by a reef, with no bottom at 90 fathoms near it. **Dah-l-Gab**, surrounded by a reef, lies 13 m. N.N.W. from Dahrat Abeed, and 5 m. N.W. from Derakkah. **Isah Abi**, which bears E.N.E., $4\frac{1}{4}$ m. from Dah-l-Gab, is another island surrounded by a reef. This group of nine islands are all low coral and sandy spots, from $\frac{1}{4}$ m. to 200 and 300 yards across, with a few bushes upon them. Between Gurb Abi Isah, Eddom-Sheikh and Dahrat Duggelet, is a reef a-wash, lying in a N. and S. direction $1\frac{1}{4}$ m., with no ground at 60 fathoms on its E. side.

The **Ahgrab Islands** are situated upon a dangerous coral reef, which is $6\frac{1}{4}$ m. in length N. and S., and $5\frac{1}{4}$ m. E. and W., including patches in its neighbourhood. There are six small islands, or more properly, sand and coral banks, on this reef, upon which when there is a swell the sea breaks heavily. The three N. ones are called the **Ahgrab Islands**; the two next S. are the Gurl Islands, and the E. ones, the Aboo Murina. The water is very shoal on this reef, caused by pinnacle coral rocks, and there is no bottom at 40 fathoms between them, and close to the W. of Gurl Island. The N. Ahgrab Island is 13 m. to N.E. of Ras Shakul; the S. Gurl Island and Aboo Murina bear N.E. by E. from Shakul; and Aboo Murina bears about W. by S. 12 m. from Derakkah Island.

About 4 m. to the S. of the Gurl Islands, and from 9 to 12 m. to the E. of Ras Shakul, is a rocky bank of 7 to 16 fathoms, with 40 and 50 fathoms between it and the shore; and 3 or 4 m. further to the E.N.E. there are 8 and 10 fathoms, with no bottom at 30 and 40 fathoms very near.

Darah Terass is a low, sandy, coral island, lying N.N.E. 12 m. from Ras Ahsees, and 17 m. to the N.W. of the Ahgrab Islands; it has 26 fathoms close to it, and 20 fathoms midway between it and the main land. A dangerous rocky reef lies 6 m. to the E. by S. from Darah Terass.

Tellah-tellah Segeer Island, lying about 15 m. to the N.W. of Darah Terass, and 15 m. E. by N. from the coast at Ras Mugda, is surrounded by a reef, with 17 fathoms near its S.E. side, and 5 near the N.W. side; and at the distance of 6 m. to the N.N.W., is a bank of 5 or 6 fathoms, with 10 fathoms on the S.E., and 30 fathoms on the N.W. side. Bearing E. by N. from Tellah-tellah Segeer, at the distance of 9 m., are the **Tellah-tellah Kebeer Islands**. These are three low sand and coral islands, having at a distance the appearance of being only one; they are covered with bushes, and the extent of the reef on which they are situated is 3 m. N. and S., and about 2 m. broad. From Tellah-tellah Segeer to these islands, the soundings are regular, increasing from 7 to 28 fathoms, and then gradually decreasing to 20 fathoms, after which they are irregular towards the islands on rocks and sand.

Tymashiya Island, a low sand and coral island, where anchorage may be obtained in great necessity, bears N.E. by E. 10 m. from Tellah-tellah Segeer. It is surrounded by a reef, and there are 6 to 12 fathoms near its S. side; but the island is too small to afford any protection from swell. About E. $\frac{1}{4}$ S., 17 m. from Tymashiya Island, is **Undi Sellee**, a low, circular, coral island, about $\frac{1}{4}$ m. in diameter. W.N.W. of this island, nearly 2 m., is a patch of rocks. About S.E., 5 m. from Undi Sellee, is **Locha**, also a low, circular island, about $\frac{1}{4}$ m. in diameter, with 67 fathoms at a short distance from its S. side. **Shab Locha** is a breaking reef, above a mile in extent, lying $8\frac{1}{4}$ m. S.W. from Locha Island, and N.W. by W. 18 m. from Eddom Sheikh Island.

THE MUSSARMROO, or MUSAHMROO GROUP. At 7 m. E. by S. from Locha, is the

Island Musahmroo, in lat. $18^{\circ} 50' N.$, and lon. $38^{\circ} 47' E.$; and to S.E. by S. 2 m. from this, stands the outer island, **Karam**, or **Gurm Musahmroo**. They are both low sandy and coral islands, with bushes on them. There is no ground at 90 fathoms close to the former. At $1\frac{1}{2}$ m. S. of the latter there are 40 fathoms. These islands are 42 m. off the Abyssinian coast. The navigable breadth of the Red Sea, abreast of them, is 75 m. only. (See also page 29.)

BARMOSA or **BAR-MOOSA SEGER**, is in lat $19^{\circ} 3' N.$, lon. $38^{\circ} 13' E.$, and bears N.W. by N. 9 m. from Tymashiya; indeed, it is a sort of connecting link between the islets off Khor Nowarat and those off Suakin. Bar-Moosa Seeger is about $\frac{1}{2}$ m. long, composed of coral and sand. To the N., and 10 m. from this island, is **Bar-Moosa Kebeer Island**, in lat. $19^{\circ} 14' N.$, lon. $38^{\circ} 11' E.$; standing 47 m. to the E. of Suakin; it is about $\frac{1}{2}$ m. in length, to E. and to W.; and is also composed of sand and coral, with a few bushes. There is a reef at about a mile to the N.W. of this island, and no bottom at 100 fathoms close to its S. side. To the W., and about 9 m. from Bar-Moosa Kebeer, is Barcoot, a low sand and coral island without anchorage, there being no bottom at 135 fathoms close to its S. side. There are four large breaking reefs, extending nearly 5 m. to the N. of this island; the second is called **Shab Barcoot**, and the most N. reef is **Shab Cootab**. The latter bears W.N.W. 10 m. from Bar-Moosa Kebeer, and S.E. by E. 8 m. from Hind Gedam. At 15 m. to the W. from Barcoot is **Sail Ad-dar Kebeer**, a small sand and coral island, lying 22 m. E. by N. from the entrance to Suakin; there is no bottom at 120 fathoms a short distance to the S.E. of it. To the N.E. by E., 7 m. from Sail Ad-dar Kebeer, is **Sail Ad-dar Island**, of similar description; and about 2 m. E.N.E. of it is a rocky patch.

HIND KADAM or **GEDAM ISLAND**, in lat. $19^{\circ} 21' N.$, lon. $37^{\circ} 52' E.$, is the most N. of those off Suakin, and about 4 m. N. by E. of Sail Ad-dar. This is a low sand and coral island, and so steep, that there is no bottom at 22 fathoms close to its S. side. It bears from the entrance of Suakin about E.N.E. 31 m. About $2\frac{1}{2}$ m. E. by S. from it is a rocky patch, and a similar patch at about the same distance W. by S. from it, with no bottom at 57 fathoms close to the W. of it.

Shab Mobiyet and **Shab Amber** are two narrow reefs, having deep water close-to; nearly joining, and forming a danger 5 m. long, N. and S.; its N. end, Shab Amber N. extreme, lies 12 m. to the W. by S. from Hind Kadam; and it bears about N.E. by E. 19 m. from the entrance to Suakin. **Shab Gusser**, $1\frac{1}{2}$ m. long E. and W., lies nearly 5 m. S.W. from Shab Mobiyet, and at about a mile to the S. of it is **Shab Tweel Reef**, upwards of 1 m. long, in a N.W. and S.E. direction, bearing nearly E. from the entrance to Suakin, distant 14 m. About 11 m. to the E. of Shab Tweel is a breaking patch, called Shab Muncar. (See *Etwid Island*, page 135.)

COAST OF NUBIA, FROM SUAKIN TO KHOR DULLOW.

Mersa Quoih or **Kuwai**, bears N. by W. $4\frac{1}{2}$ m. from Suakin; the entrance to it is narrow, and the anchorage small, but the water is smooth, and the depth 8 or 9 fathoms, mud. Should a small vessel find it necessary to anchor here, she should drop her anchor as near to one side as possible, as no great range of cable can be veered out. At this anchorage Warantah hill bears S.W. by W. $\frac{1}{2}$ W.

One mile further N. the *Benares* anchored in $14\frac{1}{2}$ fathoms to the S. of **Shab Damart**, so called from a Mersa for boats in its vicinity. It is a projecting part of the coast-reef, with indifferent anchorage on the N. and S. sides. To the S. of the dry part of the reef are some rocky patches, on one of which 4 fathoms were found, and some of them are nearly dry. Warantah hill bears from the anchorage W.S.W. Nearly 9 m. N. by W. of Suakin, is **Mersa Ahtah**, a small Khor in the coast-reef, with a narrow entrance, forming an anchorage for a buggalow: to the N. of it 3 or 4 m. are some small islands, inside the coast-reef and close to the shore, where fire-wood may be obtained. Nine miles further N. by W. is **Jezirat Abdullah**, in which there is good anchorage in 7 fathoms, soft mud, Little Hadarawi Hill bearing W. by S. This place has little protection for ships, and within the above anchorage are some straggling patches of rock: there is also one in the entrance, on which 5 fathoms were found; and there may be less. Bullocks, sheep and goats can be obtained here; fire-wood may be had for cutting, and there is a well of brackish water about $\frac{1}{2}$ m. from the beach, and just to the left of Little Hadarawi Hill from this anchorage.

The Outlying Reefs off this coast are described further on.

Hadarawi Hill is just to the S. of Jezirat Abdullah; it is at that anchorage hidden by a peak on the near high land, but towards the S. it shows as a round hill. To the N. of the peak on the near high land is a small hill, like Hadarawi, when seen from the S., and therefore has been

named Little Hadarawi. N. by W., $9\frac{1}{2}$ m. from Jezirat Abdullah, is the entrance of the following Khor or harbour.

MERSA SHEIKH BAROUD, in which the *Benares* anchored, is called after a chief of that name, the ruins of whose tomb are on the N. point of the entrance. The Khor is formed by a gap in the coast-reef, by which it is also bordered, and extends inland 3 m. The soundings in mid-channel are mud, decreasing gradually from the entrance: when abreast of the place, the notch in Az-zoodat Rileh bears W. $\frac{1}{2}$ S. The *Benares* anchored just within the ruined tomb. Sheep and goats can be procured here; there are also some springs of good water on the S. side of the Khor, about a mile from the beach; but as the road is very bad for casks, it is advisable to be provided with skins for holding water, to be conveyed to the boat on camels or asses, which may be obtained for that purpose for a trifling sum.

Az-zoodat Rileh, to the W. of Sheikh Baroud, is the highest land immediately N. of Hadarawi, and has a remarkable notch in its top, by which it may be known. Shar Kereeb, the next high land to the above, has its top in the shape of a saddle; Hadal Ourl is a peak under it, when seen from Keehai, but to the N. of it, when viewed from Sheikh Baroud, and S. of it at Mersa Duroor.

Mersa-Keehai, or Geehai, about 3 m. N. of Mersa Sheikh Baroud, and formed by the coast-reef and 2 or 3 low swampy islands, is very narrow, with deep water close to its edges; the anchorage is contracted, and the depth 9 or 10 fathoms. To sail in, keep close along the weather side, and anchor near the weather shore, in order to have room to veer cable. From the entrance, Az-zoodat Rileh bears about W. by S. **Mersa Duroor** is nearly 12 m. N. of Mersa-Geehai, or 42 m. from Suakin, and in lat. $19^{\circ} 49'$ N. The anchorage is formed in the coast-reef, with a rocky shoal off it, and some low swampy islands. There is a channel on either side of the shoal off its entrance, but the N. one appears to be best: the soundings in mid-channel are mud, and decrease gradually. The best anchorage is just within the outermost island, in $3\frac{1}{2}$ or 3 fathoms; from whence Saddle Hill, or Shar Kereeb, bears W. by N. $\frac{1}{2}$ N. A little to the N.E. of the entrance of the Mersa are some rocky patches, on which the least water found was 5 fathoms. Wood and water may be procured, although the latter is not considered quite so good as that at Suakin; but it is more convenient, being about $\frac{1}{2}$ m. from the beach, and is brought down in goat skins upon asses. Bullocks, sheep and goats are also to be had.

Mersa Fejer lies N. by W. 12 m. from Mersa Duroor. This khor is formed by a break in the coast reef, in the bight of which there is good anchorage in 13 fathoms, mud. Within this anchorage is a sandy spit, forming a small bay, in which there are 6 and 7 fathoms water; but the channel into it is narrow. There is a shoal which forms the S. side of entrance of this khor, and extends along the coast-reef in patches to Mersa Ahroos, which is 1 m. to the S., and is an anchorage for boats only; on this shoal is a 1-fathom rock, with 5 or 6 fathoms between. To enter Mersa Fejer, keep close along round the point of the reef forming the N. side of the entrance. Goomud Rabaht bears W. by N. Wood may be cut here, and bullocks may be obtained.

Goomud Rabaht, the most conspicuous land on this coast, is a high conical mountain, with a crooked peak on its top; it is just to the N. of Mersa Fejer, does not alter its appearance, and may be seen from the S. of Jezirat Abdullah to the island of Macowa. About N. $8\frac{1}{2}$ m. from Mersa Fejer, is **Awī Tereē Mersa**, a gap in the coast-reef, 600 yards wide at the entrance, and about the same depth, with 26 fathoms mud in mid-channel, which decreases to 8 fathoms close to the reefs. Country boats anchor here close-in; but there is no protection for ships. Off this anchorage Goomud Rabaht bears W. $\frac{1}{2}$ S.

Mersa Ar-rakea is 12 m. to the N. of Mersa Fejer, or 65 m. from Suakin, in lat. $20^{\circ} 13'$ N., lon. $37^{\circ} 11'$ E. The coast from Awī Tereē has some rocky patches near its reef, and the entrance to this place is surrounded by them, with deep water close to it. This anchorage is narrow, and encompassed by a reef, which, with N. winds, makes it necessary to keep the weather side of the khor close on board. In mid-channel, the soundings are 12 fathoms, mud, and there is smooth water with all winds. The ships' anchorage is on the E. side of a small coral island, which is in the entrance to a small bay of 6 and 7 fathoms. The channel into this khor is winding, and to the N. of the largest shoal off its entrance, with the mouth of the khor open, leaving two small patches on the right hand, Goomud Rabaht being then on with the S. end of the island in the bay, bearing W. by S. It is reported that excellent fresh water may be obtained here.

False Chimney Hill is to the N. of Mersa Ar-rakea; it is just seen off Sheikh Baroud as a high mountain with a rugged top, assimilating to chimneys, from whence it is so named. Its range appears to be E. and W. Off Awī Tereē and Mersa Ar-rakea, it appears as a sharp peaked mountain, like a sugar-loaf, and at Salaka its top is seen just above the S. brow of a round elongated mountain, which is known by a remarkable piece of land a little S. of it, called Table Hill; this is the lowest piece of land near the coast, a little below Salaka.

SALAKA is 14½ m. to the N. of Ar-rakea, or 79 m. from Suakin. There is a shoal about 4 m. off this place, lying about 1½ m. to the N. of the outer reefs of Salaka, and with Table Mound bearing W. ½ S. There are some rocky patches near the coast-reefs about 6 m. S. of this place, and the narrow part of the channel, between the coast and outer reefs, is only ½ m. S. of this place. There is a projecting sandy spit bordered by the coast-reef, and a small bay formed to the W. of it, between the sandy spit and some sunken rocks to the S. of it (whose discoloured water may be seen in clear weather), in which is an anchorage in 9 or 10 fathoms mud, surrounded by sunken patches of rocks. This is what Captain Court called Mousetrap Bay. The channels leading to it are narrow; that to the E. is close round the sandy spit reef, avoiding some small patches off its edge a little outside the spit, and passing between them and the larger patch to the S. of it. The S. channel is inside the sunken rocks to the S.E. of the sandy spit; it is a little wider than the E. channel, but the eye through both can be the only guide. The least water the *Benares* had in these channels was 3 fathoms, rocks, but between the sandy spit reef and shoal, to the S.E. of it, there are 9 to 4 fathoms.

Those who do not wish to go into this intricate place, may obtain anchorage outside the sandy spit, upon the S. of its reefs; but the water deepens quickly off it. The *Benares* anchored in 3½ fathoms, rocks and sand, and when brought up, was in 10 fathoms, rocks and sands. This anchorage is very indifferent, with bad holding-ground, and will not answer in S. winds; it is also doubtful if the inner anchorage is protected from them by the surrounding patches of sunken rocks. There are no supplies of any description to be had here. **Little Salaka** is 1 m. to the S. of Salaka, and is only a narrow break in the reef, which leads into a small bay, full of shoals, a fit anchorage for nothing larger than boats.

Mallago, or Chimney Hill, is to the W. of Salaka; it is a high, rugged-topped mountain, approaching the appearance of chimneys more than that named False Chimney Hill. It has the same appearance throughout, and is seen from Mersa Fejer to Macowa Island.

DUBERDABB is 12 m. to the N. of Salaka. The Tyflah Islands are to the S. of it, and between them and the main is the channel in, which is only ½ m. wide; and the anchorage bears from the N. part of the island, W. by N. 2 m. This anchorage is small, but the soundings are mud, and good protection from N. winds may be found by anchoring close up inside the point of the reef. There is a remarkable dark hill in the range nearest the coast, and the Funnel Hill appears open to the N. of it at this anchorage.

Funnel Hill, so called from its similarity, is to the W. of Duberdabb, in the S. extreme of Jebel Treber, and is shut in behind the Sugar-loaf at Macowa. **Jebel Trebur** is a high, distant mountain above Duberdabb, beyond the second slope. On its N. top, are two small rugged elevations, the N. one is seen from Awi Teree to Khor Dullow, where it shows as the highest part of land to the S. **Small Peak**, on the near hills, has a flat top, and is a little to the N. of Jebel Trebur. Sugar-loaf is a peaked mountain in the range between Jebel Trebur and the coast, and is a little to the N. of the Funnel Hill above mentioned.

THE TYFLAH ISLANDS are about ½ m. from the coast, near Duberdabb, and consist of three or four sandy patches, with a few bushes on them; they are surrounded by shoal water and sunken patches of rock; but anchorage may be had under the W. sandy patch against the N. winds, in from 10 to 4 fathoms, very irregular soundings; and protection against S. winds may be found in irregular soundings of 5 to 14 fathoms, 1½ m. to N. of these Islands. There are detached reefs spread over 8 m. to the S.E. of the Tyflah Islands. **Gatat-el-Banah**, a solitary reef, lies at the distance of 9 m. to E. by N. from these Islands; it is 7½ m. to S. by E. from Myetta Island.

Khor Makaffi is about 9 m. to the N. of Duberdabb; it is formed by a narrow break in the coast-reef, and has good anchorage for buggalows; but neither wood nor water can be obtained. Nearly 2 m. to the S. of it is **Little Makaffi**, with a breaking patch 1½ m. to the E. of it in the channel towards Macowa, which here is nearly 4 m. wide, and forms the best entrance to Dokhána.

MACOWA ISLAND is 6½ m. long nearly, N. and S., and about 1½ broad, at the distance of 4 m. from the coast, and nearly parallel thereto. Its S. point is in lat. 20° 44' N., lon. 37° 15' E. It is rather high table-land, composed of rocky sand stone, in steep cliffs, apparently worn away by the heavy rains. It has a very sterile appearance, there being nothing to relieve the eye but rocks, barren sands and innumerable shoals, excepting on the S. point of the Island, where there are a few mangrove trees. The remains of two rough but dry wells were found on the N. end, but no vestige of a tank, or any other ruin. The Island is surrounded by a coral reef, which extends 3 m. off the N. end, and thus forms the S. side of the E. entrance to Dokhána Bay. A rocky spit extends 1 m. off from the S. end, with anchorage in 12 fathoms on its S.E. side. Anchorage is also to be had on the W. side of it, in any depth required.

Myetta is a small, high, barren island, 3 m. to the E. of Macowa, situated upon the S.E. part

of a coral reef, $4\frac{1}{2}$ m. long, and nearly 2 m. broad; it has another small island upon it, 1 m. N.W. of Myetta. This reef extends nearly 1 m. S. of Myetta; and at 2 m. S.S.W. of this island is a sunken patch of rocks, and about 4 m. from it, upon the same bearing, is a $1\frac{1}{2}$ -fathom patch of rocks. These two patches, which are $1\frac{1}{2}$ m. apart, form the entrance to Macowa from the sea; the S. high part of Macowa, about W. $\frac{1}{2}$ N., should lead through between them. When the E. extreme of Macowa Island bears N., you should haul to the S.W. towards Chimney Hill, to pass round the S. tip of Macowa Reef. The Channel is $1\frac{1}{2}$ m. broad between this reef and the numerous reefs to the N.E. of Duberdabb. There is a channel between Myetta and Macowa Islands, with many sunken patches in it.

DOKHANA, or DOHONA BAY is formed by Ras Roway and the reef which extends S. from it, from the S. extremity of which it runs inland to the N.N.W. nearly 20 m.; the S. part, or mouth of this Bay, is encumbered with small islands, reefs and shoals. The part more particularly called Dokhána Bay is situated on the W. side of this extensive bay, at the distance of 18 m. N. by W., and N.N.W. from Khor Makáffl. It has good anchorage, and the water is better than that generally met with on the coast. The well is about 1 m. from the beach, to which the water-casks may be rolled and filled, or the water may be purchased of the natives: but neither fresh provisions nor fire-wood are to be procured. The E. entrance to this bay is about $\frac{1}{2}$ m. wide, the S. part being bounded by the reef off the N. part of Macowa, and on the N. by the extreme of Ras Roway Reef; the depth between being 18 fathoms. Having passed this, the breadth increases to more than 1 m., but again becomes narrower in what may be called the W., or inner entrance, formed by a sand-bank on the N.W. part of Macowa Reef and a small island off it; this is also about $\frac{1}{2}$ m. wide. After passing through the inner entrance, the soundings will be from 12 to 4 fathoms, until abreast of the third island, where they deepen; but there are many patches for which the eye can be the only guide. Having passed the third island and its extensive reef, a course about N.W. will carry the ship to the anchorage at Dokhána, which is a little to the N. of a cluster of sandy islands, off which are some rocky patches of 2 fathoms.

The channel inside Macowa, leading to Dokhána Bay from the S., is safe, as the patch in the S. part of it, off Little Makáffl, can be seen, and the soundings decrease towards the N.W. part of that island, affording an opportunity of anchoring conveniently.

The *Benares* sailed out through the E. channel from Dokhána; and, as the channel is intricate and dangerous, it has been thought proper to give an account of the proceedings:—Weighed in early morning from Dokhána, and after clearing the islands and patches of 2 fathoms, which are 2 m. from the anchorage, we steered just to the E. of the third island (which is connected to the second by the shoal water), and anchored in 7 fathoms, amongst a number of patches off the E. entrance, and about 1 m. N. of the extensive reef off the N. part of Macowa Island; the extreme S. point of Ras Roway Reef bearing E.S.E., and the entrance distant $\frac{1}{2}$ m.; the extremes of Macowa, from S. by W. $\frac{1}{2}$ W., to S. by E. $\frac{1}{2}$ E. Weighed with a light N. wind, and proceeded through the E. entrance; in standing out we had 10, 6, and 5 fathoms, rocks and sand. From thence we worked through a maze of reefs, with deep water between, and in the afternoon anchored under the lee of a reef, on its edge, in 9 fathoms, rocks and sand, about 1 m. to the E. of Ras Roway, which forms a bluff on the highest land hereabout.

RAS ROWAY lies $10\frac{1}{2}$ m. about N. by E. from the N. end of Macowa Island. Between Myetta Island and Ras Roway there is a continued mass of rocky patches, and deep, narrow channels; outside of them again are two other reefs, with two small sandy islands; which render this a dangerous part of the coast to make from the S.E. at night-time; when it is the first land-fall after leaving Jebel Teer, on the N. passage, up the Red Sea. From Ras Roway, the reefs off Jiddah on the Arabian coast bear about E. by N., and are 100 m. distant.

Oomul Groosh, or Ohm-el-Kuroosh, the outer island, is a sand-bank on a small reef, about $\frac{1}{2}$ m. in diameter, in lat. $20^{\circ} 51' N.$, lon. $37^{\circ} 26' E.$; and it is 7 m. N.E. by E. from Myetta Island. The other, called **Shab Baraya**, is 3 m. to the W. of it, and is situated upon the S. end of an extensive reef, which runs 4 m. to the N., and on which the H.E.I.C. sloop-of-war *Nautilus* was wrecked in 1833.

Dangers. From 1 to 3 m. E. of Ras Roway are three small shoals or sand-banks; and at 2 m. E. by N. of a sandy cape, which is 2 m. to the N. of Ras Roway Bluff, there are two dangerous sunken rocks.

The Coast, from the E. tip of Ras Roway, trends rather straight to the N.W. At 12 m. to the N.W. from the E. sandy cape is the S.E. end of a reef, called Shab Kumeeri, which extends nearly 5 m. N.W., and is only 1 m. off the coast, which to the S.E. of it is steep-to. There are a few patches between this shab and the coast, which can be seen by a good look-out. At 8 m. to N.W. from Shab Kumeeri is **Khor Mishmish**; there are two breaking patches about 2 m. off the

coast between, and another, considerably larger, about $2\frac{1}{2}$ m. N.E. of the entrance. There is also a dangerous sunken rock, lying at a distance of 6 m. in nearly the same direction, from Khor Shenab, on which the sea breaks sometimes: between these two latter there are no soundings. This is the outer danger hereabout, and is nearly 6 m. from the land; it lies in lat. $21^{\circ} 25' N.$

ABOO MISHMISH, or, more properly, Khor Shenab, is 35 m. to the N. of Khor Makáff. **Ras Roway**, situated between them, is a very prominent part of the Nubian coast. **Khor Shenab** is formed through a gap in the coast-reef, and extends between 3 and 4 m. inland: it is upwards of 200 yards wide at the entrance, with a depth of 30 to 15 fathoms, decreasing as you advance inwards. A vessel may run in with a fair wind, but there is no working room in it. The best mark for this khor is Quoin Hill, on with two small paps on the highest part of the land within: or it may be found by the breaking patches to the N.E. of it, which will be on with Aboo Hamahma when bearing N.W. $\frac{1}{2}$ W.; and from the S. part of these outer patches the entrance is to the S.W. 2 m. There is neither wood, water, nor fresh provisions to be had here.

Khor Dullow is nearly 5 m. to the N.W. of Shenab, and although it runs nearly as far inland, it is only about 200 yards wide, and is also a gap in the coast-reef, having in the entrance from 18 to 15 fathoms. A vessel with a fair wind may run in here and anchor, but there is no room for working. About 2 or 3 m. to the N.E. of this place is a breaking reef, called **Shab Dullow**, from the S. part of which Aboo Hamahma bears W. by N. A dangerous rock lies $3\frac{1}{2}$ m. to the S.E. of Shab Dullow; it is upwards of 5 m. from the coast-line.

Aboo Hamahma (not on the charts), is a table-topped hill to the N. of Dullow, in a range near the coast, which continues to the S., and terminates in small straggling hummocks, a little to the S. of Khor Mishmish. Haycock Peak is the most S. but one in the above range. **Quoin Hill** is to the N. of the last; it has a piece of land curiously projecting from its S. brow, which is the highest, and is situated at the upper part of Khor Mishmish. The Paps are a notch in the centre part of the highest hill, to the W. of Mishmish.

OUTER REEFS AND INNER CHANNEL FROM SUAKIN TO KHOR DULLOW.

The land throughout this tract is high and mountainous in the interior, of barren aspect, and decreases in several ranges towards the coast, and at 6 to 10 m. from it terminates in a broken ridge of hills on a sandy plain, partially covered with short furze and tufts of bad grass, which extend to the sea, without any appearance of cultivation.

The Outer Reefs forming the Inner channel along this coast are generally 2 and 3 m. from it, excepting in the neighbourhood of Jezirat Abdullah, Saláka, Duberdabb, and Ras Roway, in the latter of which places they approach within half a mile. The outermost parts of these reefs are 12 m. off the coast, and are in patches with deep water between. The first cluster extends from Suakin to 4 m. to the S. of Sheikh Baroud, or to the parallel of $19^{\circ} 31' N.$ Between this and the parallel of $19^{\circ} 36'$, or about 1 m. to the N. of Sheikh Baroud, where the reef again commences, is the **First Outlet** into the open sea.

The second cluster of reefs continues so far as the parallel of $19^{\circ} 44' N.$, or about 6 m. to the N. of Mersa Geehai, and extends about 10 m. off the coast. To the N. of this cluster is the **Second Outlet**, which terminates off Mersa Duroor, or in lat. $19^{\circ} 48\frac{1}{2}'$. These the natives speak of as the principal outlets in this neighbourhood. Close under some of the above reefs anchorage may be found; but the ports on the coast being only 12 to 14 m. apart, will, perhaps, in most cases, preclude the necessity of resorting to them. One of these anchorages is between Shab Damart and Mersa Kuwai, in 25 fathoms, mud; a second is to the S.E. of Jezirat Abdullah, in 20 fathoms, mud; a third is to the N.E. of Geehai, in from 9 to 16 fathoms, sand.

From the second outlet terminating off Mersa Muroor, the outer reefs extend in patches to the distance of 10 m. off the land, and cease a little to the S. of Mersa Fejer, or nearly to lat. $20^{\circ} 0' N.$, the inner part being distant from that port about 2 m.; and from thence is the **Third Outlet**, which extends up to the E. by S. of Awi Teree, or to the parallel of $20^{\circ} 7' N.$; but there is a rocky patch about 2 or 3 m. from the coast in the centre of it.

The outer reefs continue from the E. by S. of Awi Teree to the N., and commence in the S. part with a shoal called **Shab Suady**, about 4 m. off the coast, which is upwards of 6 m. in extent, its N. extreme being to the E. of Mersa Ar-rakea. On the inside of this shoal are many patches of sunken rocks, and the reefs continue in this way to the N. with small channels to the open sea, none of which are frequented or considered safe, until to the N.E. of Ar-rakea, where there is an opening—the **Fourth Outlet**—about half a mile in extent, with some patches of sunken rocks in its neighbourhood; and therefore it is not to be recommended, although frequently made use of by native boats proceeding to Jiddah.

With moderate N. winds, these boats can reach that port from it, and therefore an interval of one or two days' fine weather induces them to take advantage of this opening, in order to avoid the narrow and intricate parts of the Inner Channel off Saláka, and to the N. of that place. When the winds are fresh, it is usual to work from port to port daily on this coast, until up with Macowa, from whence they proceed across to Jiddah. Anchorages on rocks and sand may be obtained under many of the outer patches between Duroor and Fejer, and on those from Awi Teree to the N., particularly to the N.E. of Ar-rakea, under the S. part of the reefs, in 10 fathoms, rocks and sand.

From the outlet terminating to the N.E. of Ar-rakea, and which is not reckoned usually amongst the principal channels, the outer reefs extend in patches to the parallel of Saláka, or to $20^{\circ} 26' N.$ lat.; and 3 m. to the S. of that anchorage they are more numerous, and approach nearer to the shore, the channel being reduced to the S. of that place to half a mile or less in breadth, with some sunken rocks on the E. side of it, which are near the largest reef on that side; and when Table Mound is shutting in with the top of the False Chimney Hill, a good look-out should be kept for them. The first sunken rock is about a mile to the S. of Saláka, and to the S. of this sunken rock two patches will be seen, which may be passed on either side, but the in-shore channel is the widest. To the N.E. of these, off the end of the largest reef, is another sunken rock.

Anchorage.—If the weather is cloudy, it will at times be difficult to discern the sunken rocks and patches: it will then be advisable to remain at anchor at Saláka, or some other place about the reefs, until it clears up. If coming from the S., anchorage may be found in 7 or 8 fathoms, rocks and sand, under the two small patches already mentioned, to the W. of the largest reefs bordering the narrowest part of the channel, about 2 m. to the S. of the sandy spit at Saláka.

The Fifth Outlet from Suakin is between the parallels of $20^{\circ} 26'$ and $20^{\circ} 31\frac{1}{2}' N.$, being 5 m. broad to the open sea. From the latter parallel, at 9 m. to the S.E. of Duberdabb, where the reefs again commence, they continue in patches to the N. to lat. $20^{\circ} 43'$. This cluster approaches within half a mile of the coast, a little to the S. of Duberdabb, and the outermost patch, called *Guttat el Banah*, is 10 m. E. $\frac{1}{2}$ N. from Duberdabb, and 9 m. S.E. by E. from the sandy point of Macowa Island.

The Sixth Outlet is about 2 m. wide between the two rocky patches lying at 2 and 4 m. S.S.W. from Myetta Island. From the N. one of these, the reefs continue to the N. to lat. $21^{\circ} 3' N.$, including all those about Macowa and Ras Roway, already described.

From the two dangerous rocky patches lying E. by N. 2 m. from the sandy cape to the N. of Ras Roway, up to Khor Dullow, there are only three small clusters. One is 12 m. N.W. from the sandy cape, and is called *Shab Kumeeri*: it is narrow, and forms a channel between it and the coast, 1 m. broad, with several small sunken patches in it near to the reef. The second is N.E. of Khor Mishmish, and from $2\frac{1}{2}$ to 3 m. off shore. The third is *Shab Dullow*, lying N.E. of Khor Dullow, from $2\frac{1}{2}$ to 5 m. off shore. Between *Shab Kumeeri* and the reefs off *Shenáb* are also two small patches. There is also a single sunken rock, lying 6 m. N.E. of Khor *Shenáb*.

COAST FROM KHOR SHENAB TO SHADWAN ISLAND.

Khor Shenab, or Mishmish, is an extensive inlet on the coast of Nubia, in lat. $21^{\circ} 21' N.$, lon. $37^{\circ} 4' E.$, and has already been described in page 141. Here the surveying vessels *Benares* and *Palinurus* commenced their surveys, one to the N., and the other to the S. This inlet is the S. one of nine which lie on the coast. Khor and *Shab Dullow* have also been described.

From the outermost dangerous rock in lat. $21^{\circ} 25' N.$, to the N.E. of Khor *Shenáb*, on a N. bearing, and 15 m. distant, there is a small dangerous reef, the outer one of several: this small reef lies 12 m. from the shore, in lat. $21^{\circ} 39' N.$, lon. $37^{\circ} 7' E.$, and has no soundings near it. From this again the next outer danger is a large reef, of $2\frac{1}{2}$ m. in length, its S. end in lat. $22^{\circ} 0' N.$, and lon. $37^{\circ} 1' E.$ Between these two last-mentioned reefs there are no dangers, except those which lie 3 or 4 m. to the W., among which anchorage may be found, as well as at the latter large reef, which is nearly connected with an extensive range of reefs, extending from this for 8 or 9 m. to the shore, which here forms *Ras Elba* Cape, with a range of small hills on it.

RAS ELBA, in lat. $22^{\circ} 3\frac{1}{2}' N.$, and lon. $36^{\circ} 51' E.$, is so named from a range of conspicuous high mountains in the interior, called by the natives *Elba*, distant from the Cape 24 and 25 m. The S. and highest hill on this range, of 6,900 feet elevation, is called **South Peak**; it is in lat. $21^{\circ} 58' N.$, and lon. $36^{\circ} 28' E.$ These lofty *Elba* mountains form a magnificent land-mark. Vessels, passing up the Red Sea, should remember the prominence of *Cape Elba*. The H.E.I.C. Steamer *Feroze*, in 1848, not having seen land after passing *Jebel Teer*, suddenly at 4h., in the morning, found herself among the reefs off *Ras Elba*. The mountains had been visible for 2 hours, but the pilot could not believe they were so near as they proved to be.

Between Elba Cape and Khor Shenáb, any of the inlets on the coast afford good anchorage for ships, taking care to avoid the numerous detached reefs off the coast 3 or 4 m.; even under many of these reefs anchorage is to be got, the eyesight being your guide.

The coast, from Elba Cape to the N., is low near the sea; gradually rising inland, it takes a N.W. direction for 19 m. to a coral cliff cape, of moderate elevation, called Ras Juzreéal: there is an excellent harbour close to the S. of this cape, called **Mersa Helaib**. A vessel, wishing to anchor there, must haul close round a sandy island, nearly attached to the cape, and then haul up to the N.W. between a reef and the island; the passage is narrow, but when clear of the reef, you may stand to the S.W. and the S. into a beautiful harbour, where a vessel may anchor in 5 or 6 fathoms, $\frac{1}{2}$ m. from the shore. Good water is to be procured here at some wells about 500 yards from the beach; fire-wood is plentiful; sheep are numerous, and to be obtained from the civil and obliging natives. The coast from Ras Juzreéal takes a direction N.W. for 33 m. to Ras Aboo Darah, in lat. $22^{\circ} 40' N.$, which is due S. from the Siah Islands: to seaward it is studded with innumerable reefs and rocks. High Peak, of the Elba range, 5,000 ft. high, stands 17 m. to W. by S. of Ras Juzreéal.

Elba Island, a small low coral island, in lat. $22^{\circ} 24' N.$ and lon. $36^{\circ} 29' E.$, is situated on the body of an extensive reef or reefs, by which it is surrounded; anchorage may be found on some spots, in this reef, but sunken rocks are numerous about it.

The Siah, or Seeall Islands are three in number, low and sandy, and partly covered with bushes: they are 8 or 9 m. from Aboo Darah, the nearest part of the coast, and surrounded by numerous rocks and reefs, with intricate passages among them. The E. Seeall Island is the largest, being about 2 m. long, from E. to W. These Islands are the residence of numerous fishermen of the Hootainy tribe; the large island is in lat. $22^{\circ} 47' N.$, and lon. $36^{\circ} 12' E.$, and can be seen at times from the large reef Aboofenderah, which is $7\frac{1}{2}$ m. to the N.E. of Seeall Island.

Shab Aboofenderah Reef, in lat. $22^{\circ} 54' N.$, and lon. $36^{\circ} 17' E.$, bearing N.W. by N. from the outer large reef off Elba Cape, just described, is very large, 3 m. from E. to W., and it is the S. and outer reef of what was called in the old charts Foul Bay. It has anchorage on its S. side, but studded with numerous small patches of rocks: there is also a small rock about 20 ft. high on its E. extreme, probably the remains of an island, the outer part being washed away.

Having drawn a line between Aboofenderah Reef and the outer reef off Cape Elba, it just touches the outer reefs between these two points, extending and detached from the shore. Their positions remain to be described, as follows: One small reef, lat. $22^{\circ} 10' N.$, 2 m. to the W. of the line, and the same distance from shore. Two small reefs in lat. $22^{\circ} 15\frac{1}{2}' N.$, 1 m. to the W. of the line, and $5\frac{1}{2}$ m. from the shore. The outer reef of a group, in lat. $22^{\circ} 35\frac{1}{2}' N.$, just on the line, on a bank of soundings, extending 20 m. to the N.W., as far as the Siah Islands. These reefs are very dangerous, having numbers of detached rocks about them; however, if a small vessel is in want of anchorage, she may find shelter under most of them.

Meereer, a low sandy islet, surrounded by numerous reefs, lies about 35 m. to the N.W. of the large Siah. **Mersa Sharb**, lying on the coast between, has good anchorage for a small vessel in its entrance; and there seem to be fewer reefs off this place than either to the N. or the S.E.

ST. JOHN'S ISLAND, or **SEBERJET**, in lat. $23^{\circ} 36' N.$, and lon. $36^{\circ} 10' E.$, is a small high island, of 1000 ft. elevation, and of a circular form; the hill in the centre of the island forming a remarkable sharp peak of volcanic origin. This island was formerly famous for its emeralds, but now is the lonely abode of one or two fishermen, who are constantly on the look-out for turtle, which are very numerous hereabouts, and valuable for their shell. The island neither affords water nor vegetable production, being dreadfully barren; it is steep on all sides, having no soundings near the band of coral reef which surrounds it, or, more properly speaking, which constitutes its base. During the survey of the Red Sea, the surveying vessel *Palinurus* held on this island during a N.-Wester, by hooking the kedge anchor to a hole in the reef, and making fast. At 3 m. to the S.E. of Seberjet, there is a small steep rocky island, with no soundings near.

Foul Bay, the S. point of which lies to the W. of Seberjet Island, and to N.W. of Aboofenderah Reef, is full of reefs and sunken rocks; a line drawn from Aboofenderah Reef, on a N.W. bearing, to lat. $22^{\circ} 54' N.$, and lon. $36^{\circ} 18' E.$, touches the outer boundary of reefs to the N.W., till this line is crossed by another drawn to the S.W. from Seberjet. This last line, or Seberjet bearing N.E. by N., will lead vessels clear to the E. of St. John's reef and others.

St. John's Reef lies in lat. $23^{\circ} 26' N.$, and lon. $35^{\circ} 59' E.$, or 14 m. to the S.W. of the island. Other reefs lie to the S.W. and W. of this outer reef; indeed this part of the sea seems a nest of reefs. Therefore no vessel should pass to the W. of a line drawn from it to Macour Island, unless in charge of a pilot. There are numerous reefs in the northern part of Foul Bay, which is bounded on the N. side by Macour Island and Ras Benass promontory.

Macour, or Emerald Island, bears from St. John's N.W. $\frac{1}{4}$ W., distant $23\frac{1}{4}$ m., and is in lat. $23^{\circ} 50' N.$, and lon. $36^{\circ} 48' E.$, and distant between 3 and 4 m. from the low sandy cape at Ras Benass; the island is small, not being above a mile in length, and about 100 ft. high in the centre, composed of one mass of coral, and affords no anchorage, bottom not being found. It is surrounded by a coral reef, which, off the N.W. end, extends half a mile from the island.

RAS BENASS.—The body of this cape, on which are some moderately-elevated hills, lies in lat. $23^{\circ} 55' N.$; the outer extreme of the cape, in lon. $35^{\circ} 47' E.$, is a low sandy point running out to the S.E. On the E. side of the cape there is no bottom at 30 fathoms close to the shore; on the W. side there is an extensive reef running off to the S. as far as the parallel of Emerald Island; off the extreme S. point of the reef are numerous small reefs and rocks, with irregular soundings between them, from 8 to 30 fathoms. The channel between this reef and Emerald Island is $1\frac{1}{4}$ m. broad, with overfalls from 7 to 12 fathoms, rocks. A vessel coming in through this channel must be cautious not to come too close to the sunken rocks and reefs off the cape, till in deep water; she may then work up to the anchorage N.N.E. to the head of the bay, and anchor in 10 or 12 fathoms, about 1 m. from the shore, well sheltered from all winds, the low sandy cape off Ras Benass bearing S.E., distant $3\frac{1}{2}$ m. In working up, care should be taken not to come too near to the low sandy cape, on account of the numerous rocks near it. On the main land, are some ancient Egyptian ruins, nearly covered with sand, and supposed to be the remains of the city of Berenice. Off this place, vessels can anchor in from 8 to 12 fathoms.

Near the beach, in Foul Bay, is a range of high, remarkable peaks, called Berenice Mountains, which are seen some distance from sea; the N. and highest one of this range is 4,440 ft. high, and lies in lat. $23^{\circ} 34' N.$, and lon. $35^{\circ} 20' E.$

The Coast, from Ras Benass, runs W.N.W. 7 or 8 m. to a point, off which there are two small reefs, distant from the point about 2 m.; the land there forms a deep bay, having no soundings near the shore. In lat. $24^{\circ} 10' N.$, and lon. $35^{\circ} 40' E.$, there is a large reef, called the **Fury Shoal**, and several small ones to the N.W.; the outer one distant from the main 9 or 10 m. There is anchorage in 6 or 7 fathoms, rocks, on the S. part of Fury Shoal; but it is very bad holding-ground, and difficult to approach, being studded with small rocks. From the Fury Shoal, the dangers extend only a few miles off the coast of Egypt to Cosire, and will be mentioned as follows:—To the W.N.W. of the Fury Shoal, and on the main land, there is good anchorage, called **Mersa Wadi Lehuma**, in lat. $24^{\circ} 12' N.$, in 7 or 8 fathoms, under the lee of a low point, off which a narrow reef projects to the S., between which and the main a vessel may anchor. To the E. and to the N.E. of this anchorage, there is a cluster of small reefs in lat. $24^{\circ} 13'$ and $24^{\circ} 14' N.$, and lon. $35^{\circ} 34' E.$, with no soundings close to them; and 9 or 10 m. to the N.W. is another cluster, with numerous detached rocks in the channel between them.

Jebel Wadi Lehuma, in lat. $24^{\circ} 12' N.$, lon. $35^{\circ} E.$, is the highest peak of the Emerald Mountains, which stand about 40 m. to the W.N.W. of Ras Benass. This magnificent peak has been seen in clear weather upwards of 100 m.; it stands about 21 leagues to the S.W. of the light-house on Dædalus Reef.

Mehabees, or South Island, is the most S. of four low sandy islands, situated near the main land, and lying nearly N. and S. from each other. South Island lies in lat. $24^{\circ} 19' N.$, and lon. $35^{\circ} 22' E.$, and 2 m. off the main, to which it is joined by an extensive reef, $1\frac{1}{4}$ m. long. These islands, the N. one of which, called Seeoul, is in lat. $24^{\circ} 23\frac{1}{4}' N.$, are surrounded by extensive reefs, with narrow passages between them, which are studded with rocks. Along the outer or E. edge of the reef there is no bottom at 30 fathoms close to the rocks. To the S. a vessel may anchor in 8 or 10 fathoms water between South Island and the main: there are two small reefs to the S.E. of South Island, about 1 m. distant, and two small patches, $3\frac{1}{4}$ m. to E. by S. Other dangerous reefs lie at 6 m. and 7 m. to the E. by S., and the E.S.E.; and others again between these and the **Fury Shoal**.

A small reef lies in lat. $24^{\circ} 29' N.$, and lon. $35^{\circ} 20' E.$, with several sunken rocks near it, $4\frac{1}{4}$ m. from the shore, and 3 m. from the N. extreme of the reef joining the four islands to the S.E., with overfalls from 14 to 30 fathoms between the patches of rocks. **Ras Ohm-ul-Ahbas**, in lat. $24^{\circ} 33' N.$, is a low point, to the S. of which there is indifferent anchorage under its lee, close to the shore, in 10 fathoms, and good shelter from the N.W.: it lies nearly S. from the Island Wadi Jumaul, distant 6 m., and can be easily known by a remarkable sugar-loaf hill close to the beach, which is 300 or 400 ft. high.

Sherm Sheikh, in lat. $24^{\circ} 36\frac{1}{4}' N.$, and 4 m. S.W. of the S. point of Wadi Jumaul Island, is a cove in the main land, the entrance to which is about 200 yards broad, the anchorage capacious at the further end, in 10 fathoms, sand and mud. Wood can be procured here close to the anchorage.

Wadi Jumaul is a low rocky island, in lat. (the centre) $24^{\circ} 30\frac{1}{2}'$ N., and lon. $35^{\circ} 11'$ E., $2\frac{1}{2}$ m. in length N.W. and S.E.: there is an extensive coral reef off the N. end. The channel between the island and the main is dangerous, being full of small reefs and patches of rocks. Off the S. point there is a spit of shoal water, on which a vessel may anchor in 8 or 10 fathoms, sand and rocks, with the centre of the island bearing N. A dangerous sunken rock lies E. by N. 5 m. from the island, and another to the N. of the island 5 m. A small shoal, in lat. $24^{\circ} 46\frac{1}{2}'$ N., lies 7 m. to the N. of the island, and another half-way between them. The coast about this part ought to be approached with caution when within 15 m. of the land, as far as lat. 25° N.

DÆDALUS REEF, or **Abdul Kheesan**, the only reef in centre of Red Sea, lat. $24^{\circ} 58'$ N., lon. $35^{\circ} 51'$ E., and 41 m. to the E.N.E. of Wadi Jumaul, used to be dangerous before the iron light-house was erected there (by Mr. W. Parkes, C.E., the eminent harbour-engineer). During the S.-Easter season of the Red Sea, Nov. to March, the sand-bank used to be covered.

The Light on **Dædalus** is fixed, 61 ft. above sea, visible 14 m.; the light-house is 70 ft. high, from base to vane; of open iron-work, painted Red, and hoists the Turkish flag. The Brothers Islands bear from the **Dædalus** Light N.N.W. $\frac{1}{4}$ W. (by compass), or N.W. by N. (true), and are distant 98 m. (See page 29.)

The Coast of Egypt. **Ras Doorah**, in lat. $24^{\circ} 53'$ N., and lon. $34^{\circ} 58'$ E., is a low point of the main, with a long reef running parallel and close to it. To the North of the cape 4 m., there is a dangerous rock, and several other detached rocks to E.S.E. 8 m.; this part is dangerous for ships. **Mirza Toondebah**, in lat. $24^{\circ} 57'$ N., and lon. $34^{\circ} 56'$ E., is an anchorage close in shore, where a vessel may anchor in 10 fathoms, under shelter of a low point, and a small reef projecting from it. To the E.N.E. $3\frac{1}{2}$ m. from this anchorage, there is a small reef, with anchorage on its S.E. side. In lat. $25^{\circ} 4'$ N., and lon. $34^{\circ} 55'$ E., there is a reef $2\frac{1}{2}$ m. from the shore, on the S. extremity of which a ship may anchor in from 10 to 18 fathoms, well sheltered from N.W. winds. In lat. $25^{\circ} 12'$ N., and lon. $34^{\circ} 48'$ E., anchorage will be found in a small, narrow cove, called **Mirza Zebara**, the entrance not more than 100 yards broad, but perfectly sheltered; to the N. of this lies the **Elphinstone Reef**, discovered in the *Palinurus*, in 1827, in lat. $25^{\circ} 18\frac{1}{2}'$ N., and lon. $34^{\circ} 49'$ E. To the W.N.W. of this reef $5\frac{1}{2}$ m., is indifferent anchorage, on the main land in **Mirza Debah**, between which and **Elphinstone Reef** are several shoals and rocks, 3 m. from the shore. **Mirza Mombaruck**, a good anchorage, in lat. $25^{\circ} 30'$ N., and lon. $34^{\circ} 39'$ E., is a small bay with soundings of 6 and 7 fathoms inside. Care must be taken in anchoring, as there is a sunken rock in the middle of the bay, visible from the fore-yard. **Ras Humroo** is 4 m. N.W. of this, and is a bluff, red cape. **Mirza Trombee**, in lat. $25^{\circ} 42'$ N., and lon. $34^{\circ} 33'$ E., is an anchorage in 7 or 8 fathoms, a little sheltered from N.-Westers by a low point of the main. To the N. of the point are two small shoals close in-shore. Soundings of 17 and 20 fathoms are near them, as well as 3 m. to the E. and N.E.

Ras Abou Haja, in lat. $25^{\circ} 58'$ N., and lon. $34^{\circ} 22\frac{1}{2}'$ E., is 11 m. below Cosire, bearing S.E. by S. from the town. Off this cape there are two sunken rocks, distant from the shore 1 m. There is a black hill, shaped like a cone, standing among a number of low sand-hills, about 3 m. in-shore, which bears from the rocks W.S.W. $\frac{1}{4}$ S.

COSIRE, **COSEER**, or **KOSAIR**, the town is in lat. $26^{\circ} 7'$ N., and lon. $34^{\circ} 16'$ E., and contains about 2,000 inhabitants. The houses are low, and built on a sandy point, projecting a little from the line of coast: a small Turkish fort occupies the more elevated ground at the back, or land-side of the town, and can be seen by a ship at sea 10 or 12 m. distant. The coast, 8 or 9 m. N. and S. of Cosire, is very low: and a long line of moderately-elevated hills, 5 or 6 m. inland, presents no prominent marks to guide a ship into the port, more particularly at night-time. **Jebel Abou Tiour**, a distant mountain, of about 4,500 feet elevation, is the most remarkable; the N.W. brow of it is the highest part, and bears from the anchorage S.S.W. distant $19\frac{1}{2}$ m. This hill can seldom be seen at night. The Egyptian coast from **Ras Benass** to **Cosire**, is thinly peopled by the **Ababdeh** tribe, and wandering parties are found as high as **Suez**. They are in general poor, and said to be treacherous and cruel.

Should a ship, making this port, not be certain of her latitude, it would be better to make the **Brothers** (hereafter described), and then, if N.W. winds are blowing, stand in for the coast, 7 or 8 m. to the N. of the port, then bear up close along it. **Caution.** A ship cannot be too careful not to get to the S. of the port. This has frequently been the case, and a few miles to the S. has taken three or four days to beat back; for when N.W. winds are blowing, a continued drain of current and heavy swells sets along, and some distance from the coast. If a ship by accident should get to the S., she had better stand over to the coast of Arabia, and make her northing there, than short tacks on the Egyptian coast. If a vessel makes the port at night, and does not intend to anchor, she ought not to heave-to, but keep off and on under topsails, or she

will drift to leeward. If the wind be light, she may anchor on a small patch of soundings from 15 to 17 fathoms, sand, which lies $1\frac{1}{2}$ m. to the E. from the fort; between this bank and the anchorage in the roads there are soundings of 45 fathoms.

In anchoring at Cosire, the best place is close to the point of the reef forming the roads. Should the wind blow hard from the N.W., a vessel may, by placing a grapnel on the reef, haul close up to it by a hawser, as the native boats manage, in a line of S.S.W. from the point of the reefs. The sand in the roads is shoal, having only $1\frac{1}{2}$ fathoms water on it. Having anchored near the reef, another bower anchor ought to be let go to the S.S.E., in case the wind should change to the S., from which quarter it seldom blows hard, and there is little danger with a long scope of cable, and as the ground holds well, being sand at the top and clay underneath. This place, in a few years more, will not afford shelter for boats, which are daily arriving to carry away the immense quantity of grain for Arabia, bringing as ballast a quantity of sand, which they are allowed to throw overboard into the roads, and is fast filling them up. Variation of the compass is $5\frac{1}{2}^{\circ}$ W. On the F. and C. of moon, H. W. occurs at 6 h.; rise and fall 3 ft. Easterly winds are not to be dreaded here; being the sea-breeze, they are only light and pleasant, and bring with them little or no swell.

THE BROTHERS are two small coral islands, situated in lat. $26^{\circ} 19' N.$, and lon. $34^{\circ} 50' E.$, and bearing from Cosire E.N.E. 33 m. distant; they are 40 or 50 ft. out of water, steep all round, and have no soundings between them; they may be seen 10 or 12 m. off.

It is proposed to place a light on the Brothers.

The coast to the N. of Cosire forms a straight line N.N.W. and S.S.E., as far as lat. $26^{\circ} 38' N.$: it is safe to approach, and clear of dangers, except off one small anchorage called Gouay. A line from the outer roads of Cosire drawn N. by W. clears all the dangers on the coast of Egypt to the N., as far as the Jafatain Islands; to the N. of which has been included in the Straits of Jubal. From Cosire to Suez, the country inland is occupied by the Mahahzi, a small tribe bearing a bad character; but they are seldom seen near the coast.

Gouay is a small Bedouin village, in lat. $26^{\circ} 21' N.$, and lon. $34^{\circ} 8' E.$ Here is good anchorage for small craft close to the shore, among a cluster of small reefs and rocks, in 4 or 5 fathoms. Off this place are several dangerous reefs, with soundings between them and the shore; they bear from the anchorage about N.N.E. 2 and $3\frac{1}{2}$ m., and lie in lat. $26^{\circ} 23\frac{1}{2}' N.$, and $26^{\circ} 25' N.$, and from 2 to 3 m. off shore, with soundings about them to the N. and N.E. 2 m. The coast is then clear as far as Safadger Island, between which and a low woody point of the main, called Safadger Ulbur, are three small reefs, in lat. $26^{\circ} 40' N.$, and the outer one in lon. $34^{\circ} 3' E.$

Safahja or Safadger Island, 5 m. long, S. by E. and N. by W., and 2 m. broad at the N. part, lies between lat. $26^{\circ} 43' N.$ and $26^{\circ} 48' N.$. The S. end is a long, low, sandy point, and on the N. end there is a remarkable table-hill about 150 ft. high, and in lon. $33^{\circ} 57\frac{1}{2}' E.$ Bearing E. by S. from this hill, distant $4\frac{1}{2}$ m., lies a dangerous coral reef about $\frac{1}{2}$ m. in extent, with no soundings near it, in lat. $26^{\circ} 46\frac{1}{2}' N.$ Two other reefs lie to S.S.E. of this last-mentioned reef, one distant 2 m., the other $4\frac{1}{2}$ m., and are 6 m. off shore. This last reef is the outer danger near Safadger Island, and is called **Shab Shear**, in lat. $26^{\circ} 42' N.$, and lon. $34^{\circ} 4' E.$ Safadger Island is situated in the centre of a deep bay, in which there is good anchorage, both to the N. and S. of the island; the soundings are very irregular, from 5 to 25 fathoms, sand and rocks. The best anchorage in this part of the bay is near the S. point of the island: from the main an extensive reef projects out, and extends to the S. as far as the low woody point called Safadger Ulbur. The channel between the Island and the main gradually decreases, until it becomes not more than 200 yards broad, and the depth of water 3 fathoms: it then increases until you pass the Island, and enter the northern bay. The E. side of this Island is lined by a narrow reef, with no soundings at 30 fathoms close to it; off the N. end a narrow reef projects in prongs to some distance. Between this reef off the N. end of the Island, and the islets joining Ras Abou-Soomi, is the channel into the N. bay: but there is a shoal in the middle of the channel, which bears from the table-hill on Safadger due N., distant $2\frac{1}{2}$ m. In the upper part of this bay there are three small islets, two of which are connected together by a reef. Haul round the outer of these two islets, and a vessel will find good anchorage between them and the main. The soundings are irregular, from 7 to 25 fathoms, sand and clay. The bay shelters from all winds. The channel between the above islets and reef is $1\frac{1}{2}$ m. broad. **Ras Abou-Soomi** is in lat. $26^{\circ} 52' N.$, and due N. from Table Hill on Safadger Island. This cape forms the N. extreme of Safadger Bay; it is rather high, and safe to approach, having no bottom at 30 fathoms close to the shore.

Sail Hasheesh, or Abou Mokhadij, are two small islets, the largest in lat. $27^{\circ} 3' N.$, and lon. $33^{\circ} 55' E.$, lying in the centre of a small bay, formed by Ras Khor Abobah. There is anchorage in 10 fathoms close to the N. point of the bay, affording good shelter from the N.W. and N.

THE J'FAHTIN, or JAFATAIN ISLANDS, are five in number, the S. part of the largest being in lat. $27^{\circ} 12' N.$, and lon. $33^{\circ} 57\frac{1}{4}' E.$ The **Great Jafatain** is a long, narrow island, moderately high at the N. part, its length about $5\frac{1}{4}$ m.; between it and the main is a low, woody island, called **Aboo Mingrah**, to which it is joined by an extensive reef, which extends off the N. point of Great Jafatain in several prongs. The passage between it and Ras Salam (the point of the main) is not more than $\frac{1}{2}$ m. broad, and the soundings in it are extremely irregular. In passing through it, the surveying brig *Palinurus*, frequently had 25 and 30 fathoms, then 6 and 7 fathoms the next cast. The reef projects off the W. side of the Great Jafatain, and gradually shoals towards it; on any part of which there is good anchorage in 5 or 6 fathoms, sand.

Little Jafatain is a small, but rather high island, lying close to the E. side of the Great Jafatain. There is indifferent anchorage close to the S. end of the channel between the islands, in 10 or 12 fathoms, rocks. A small island, called **Aboo Tamahla**, bears S.E. from the S. end of Great Jafatain, distant $1\frac{1}{4}$ m.; it is steep all round. There is a dangerous patch of rocks close to the S. point of the Great Jafatain, and another patch to the S.W., distant $1\frac{1}{4}$ m., or due W. from Aboo Tamahla 2 m., with soundings about them. There is also a small coral reef S. by W., distant $2\frac{1}{4}$ m. from the S. point of the Great Jafatain, having soundings about it. Between this shoal and the main, nearly in the centre of the bay, is a small low reef, **Mugomish**, having an island on its S.W. point, and a spit of sunken rocks bounding its S.W. side. Between this island and the main is an extensive reef in mid-channel, in the bay formed by the islands and Cape Khor Abobah. There is no bottom in mid-channel, and irregular over-falls as you approach the shore and islands. From Jafatain Islands to the N. the coast forms a deep bay as far as the Sea of Zeitee.

THE STRAIT OF JUBAL AND GULF OF SUEZ.

The **Strait of Jubal** extends from Ras Mahomed to Toor Harbour, on the Arabian side; and from the island of Shadwan to the peninsula of Zeitee, on the other. On the Egyptian side, the island of Shadwan, the Seaul or Clive Islands, and reefs to the E. of them; Jubal Island, Gaysoom, Ashrafi Islands, and reefs to the E. and N.W., and the peninsula and high land of Zeitee. In the Strait of Jubal there are regular tides; also in the Sea of Suez, strong enough, when contrary, to prevent a ship from working to windward. Vessels passing either up or down the Strait should keep the Egyptian shore on board; the light-house and soundings round the Ashrafi Reef will enable a vessel to approach within a mile of the light.

Coming from the N., immediately after passing Ras Zeitee, the light-house is visible; keeping it under the high part of Shadwan Island by day, or not bringing it to the E. of S.E. by S. by night, clears all dangers N. of the Ashrafi Island and Reefs. After passing to the E. and S. of the Light-house, keep it shut in under the high land of Zeitee. By night, do not bring the light to the N. of N.W., taking care when the light has dipped not to bring the E. extreme of Shadwan Island, as you approach it, to the E. of S.S.E.; on account of the **Aboo Nahas Reef**, on which the P. and O. steamer *Carnatic* was lost. (See also page 28.)

SHADWAN is a large high island 700 ft. high, with precipitous sides, and is 7 m. in extent, N.W. and S.E.; the S. high part lies in lat. $27^{\circ} 28' N.$, and lon. $34^{\circ} 2\frac{1}{4}' E.$ There are no soundings on its E., S., and S.W. sides with 40 fathoms. On its W. side, fronting the Egyptian shore, and near the N.W., there is a low sandy and rocky point, extending a considerable distance to the W.: soundings from 8 to 10 fathoms extend from this point to the S., and towards the island. This is excellent anchorage in N.W. winds; but care must be taken to avoid a very small sunken rock, nearly in the middle of the bay; this rock can be seen if a good look-out is kept, having only 2 or 3 ft. water on it. This anchorage will answer very well for a vessel making the Straits in blowing weather, as you may work up under the lee of Shadwan in quite smooth water; the winds are sometimes very baffling under its lee, more especially when it blows from the N.W., in the Straits. The distance between the W. side of Shadwan to the reefs off the Egyptian shore is 5 or 6 m., having several shoals mid way.

A large shoal, nearly 2 m. in extent, having no soundings on its E. side, lies about 8 m. off the coast, and with the S. part of Shadwan bearing E.N.E., distant 8 m. To the N.W. of this shoal at 3 m. there are others, off which, and in the space between them, there are 10 and 25 fathoms. A small island of coral cliffs, called **Gumrah**, lies 3 m. to the S.E. of the large shoal; it has no soundings near it, and bears from Shadwan, high part, S.W., distant 9 m. Two small shoals, with no soundings to the E. of them, lie S.S.E., distant $1\frac{1}{4}$ and 3 m. from Gumrah. These are all the dangers in the channel to the W. of Shadwan; excepting the coast reefs.

After anchoring at Shadwan, a ship may proceed through the N. channel, where there is smooth water, into the Strait of Jubal. This channel lies between the N. end of Shadwan and

the Saul Islands. A reef extends off the N.W. end of Shadwan $\frac{1}{2}$ m., between which and the Saul Islands there is a small reef in mid-channel. Bearing N. by E. from Shadwan N.W. point, distant between 2 and 3 m., is a small but dangerous reef, **Abou Nahas**, there are no soundings on the E. and N. sides of this reef; but there are 10 and 12 fathoms a little off the S.E. side, where a vessel might anchor upon an occasion: the high part of Jubal bears from this reef N.W. by W. distant 7 m.; the E. or high part of Shadwan S.E. $\frac{1}{2}$ S., and its W. extreme about S.S.W.

The Saul Islands are small, low coral islands; the E. one, the largest, surrounded by a reef, having no soundings near it; the other two islands lie $1\frac{1}{2}$ m. to the W. of the former: they are three small broken coral cliffs, and are situated on the N. part of an extensive reef, off the S. side of which there is anchorage on a sandy bottom. Care must be taken not to approach this reef too close, as there are numerous coral rocks detached from it, which can be easily seen. In this channel a N.W. wind will carry a ship into the Strait of Jubal, passing close to the reefs off the Saul Islands, between them and the reef as mentioned, off the N. end of Shadwan. In hauling up to the N., you pass close to a large horse-shoe-shaped reef, which lies about $1\frac{1}{2}$ m. to the N. of the E. Saul Island. These are the only dangers between Shadwan and Jubal, and in working in the large strait near these two islands, a bearing of Shadwan is the best guide to the S., and of Ashrafi Light-house to the N. Shadwan, S.E. part, bearing S.E. by S., touches all dangers on the W. side of the Strait, including Jubal and Ashrafi Reefs, and up to the high land of Zeitee.

Jubal Island, the centre or high part of which is in lat. $27^{\circ} 38' N.$, and lon. $33^{\circ} 47' E.$, is 420 ft. high, elevated in the centre, and of a circular form, being about $2\frac{1}{2}$ m. in diameter; the E. side is steep, having soundings near it at depths of 30 and 40 fathoms; but deeper than that at 1 m. off. On its S.S.W. side, two low coral islands nearly join, being connected with it by a reef. **Tawileh**, the S. one, is larger in area than Jubal, and there is a clear sea between its W. shore and the Egyptian coast, which may be coasted along from the S. into the Bay of Ras Gimsah, which runs up 15 m. to N.W. by W. of the S. end of Tawileh. On hauling round the S. end of Jubal, good anchorage is to be found between it and the reef off the low coral islands in 7 or 8 fathoms, sandy bottom, distant about $\frac{1}{2}$ m. from Jubal, with the high part bearing N.; this is excellent anchorage in S.W. winds, and from which a vessel can easily proceed again into the Strait, and make the anchorage under Shab Ali. From 1 to 4 m. to the N.N.W. of Jubal are three low coral islands connected with it by a reef, in which they are situated; the largest one, being near Jubal, forms a small bay with the N. end of Jubal, in which there are soundings of 25 and 35 fathoms: it would not answer as an anchorage. The N. end of **Gaysoom Island** has a small brown hillock 80 ft. high on its extreme point, which bears from Jubal about N.W., distant 4 m. There is a deep channel, between Jubal and Gaysoom, in which there are soundings from 25 to 38 fathoms, with good anchorage, close under the S. end of Gaysoom. The disadvantage of this anchorage is, that a ship runs so far to leeward before she obtains shelter from the N.W. swell, and loses time in beating back again through the channel.

Gaysoom, or Keisoom, from its N. point (which bears W. 2 m. from the N. end of the shoal off Jubal), extends to the S.W. $3\frac{1}{2}$ m., where it is nearly joined by W. Gaysoom, a low coral island, extending to the N.W. $2\frac{1}{2}$ m.; the N. point of this W. Gaysoom, which is 55 ft. high, lies W. by N. $\frac{1}{2}$ N. from the brown hillock on Gaysoom, distant $3\frac{1}{2}$ m., between which it forms a bay, with soundings of 20 and 30 fathoms. Although the entrance to this bay is 1 m. broad, the N.W. swell comes in from Zeitee, and renders it unsafe anchorage; the N. side of the channel is bounded by Dhakrah Islet on the S. point of the reef, extending to the S. of the Ashrafi Islands.

Ohm-el-Kroosh Harbour is a singular oval basin, formed to the S. of the Ashrafi Islands by a bank of coral and sand, forming a loop towards Gaysoom, and having the low sandy islet, Dhakrah, at its S. extreme. It has from 6 to 8 fathoms inside, and the entrance on the E. side (with 16 ft.), is only a break in the circling reef, and barely 2 cables wide. Small vessels, drawing 13 ft., may enter by keeping the islet off the N. point of the W. Keisoom, on with a sharp distant peak of the main land bearing W. by S. $\frac{1}{2}$ S., until the water deepens to 6 fathoms; then (to avoid a shoal in front of the entrance) haul sharp to the N.W. and N., for the white beacon on Ohm-el-Kroosh Islet, which stands half-way between the hillock on W. Keisoom and the Ashrafi Light-house. Larger vessels may enter, but the channel should be previously buoyed.

Good anchorage under Dhakrah Islet may be had in from 7 to 10 fathoms, sand and coral; steer for the latter in one with the islet off the N. tip of W. Keisoom, bearing W. by N., and anchor 2 cables to the E. by S. of Dhakrah, where the N. point of the E. Keisoom will bear about S.E.; thus you will have protection from both S.E. and N.W. winds.

THE USHRUFFEE, or ASHRAFI ISLANDS, are a group of low coral islands, scattered on an extensive reef, which bounds the W. side of the channel, in the Strait of Jubal; the N. end of these islands and reefs extends N.W. by N., distant 12 m. from the centre of Jubal. To the E.

of the Ushuffee Islands, distant 1 m., are two small and dangerous reefs, connected with each other, leaving a channel between them and the islands. There is also indifferent anchorage under the lee of them, and soundings of 10 or 12 fathoms extend a little to the E. of them; the light-house is now the guide for a ship nearing them at night. There are soundings of 17, 20, and 35 fathoms to the N.E. and N. of the Ashrafi Islands and Reefs, distant 1 or 2 m. from the light-house.

The Ashrafi Light, revolving every minute, is exhibited on the N.E. part of the reef; 125 ft. above H. W.; visible 18 m., in lat. $27^{\circ} 47\frac{1}{2}'$ N., lon. $33^{\circ} 42'$ E. The structure is of open iron-work, designed and erected by Mr. W. Parkes, C.E.

Tides. It is H. W. on F. and C., at $6\frac{1}{2}$ h.; rise of tide about 2 ft.; the ebb-tide is said to set to the N.W., and flood to the S.E., from 1 to 2 m. per hour. But there is a sad dearth of information as to the set of tides and currents in Jubal Strait.

A Reef, between the light-house and Zeitee Islet, is the N. danger on the W. side of the Strait; it has two coral islets (7 ft. high); here the N.W. swell breaks with violence.

Between this reef and the high land of Zeitee there is a fine bay, with soundings on mud in 17 and 20 fathoms, but the N.W. swell rolls into it; yet anchorage in smooth water may be found in its N. part, close under Zeitee Islet, a low sandy island and reef extending a little way from a projecting point of Zeitee, called **Petroleum Point**, from having some petroleum wells about 1 m. to the N.W. of the point, and close to the beach. This point bears from the reef to the N.W. of the Ashrafi Islands, W.N.W., about 3 m.

The S. point of Zeitee is quite low, and nearly 6 m. to the W. of Ashrafi Light-house; and nearly joined by a low coral island, to the S. of which 2 m., extends a reef, having a channel between it and the reef off Gaysoom Island, which leads into the Zeitee Inlet, a deep bight, running up to the N.W. for 5 m. In this bay, or at its entrance, a ship may anchor, if she is very desirous of obtaining wood, with which the Egyptian coast abounds in the Bay of Zeitee; and, strange to say, Suez is partly supplied from this place by boats: the wood is all dry.

The Coast to the N. of Petroleum Point is safe to approach, close to the high land of Zeitee, having 30 or 40 fathoms close to the beach or rocky shore.

The high land of Zeitee, from 1,000 to 1,500 ft. high, is a narrow spinal range, about 2 m. from and running parallel with the sea shore for 15 m., about N.W. and S.E.; its S. end stands about 8 m. to the W. by N. of Ashrafi Light. **Ras Zeitee**, the most prominent cape of it, is in lat. $28^{\circ} 0' N.$, lon. $33^{\circ} 28' E.$, and the dangerous part of **Toor Middle Shoal** lies about 10 m. due N. of this cape.

Ras Shukhair, on the Egyptian side, is a small point, in lat. $28^{\circ} 5\frac{1}{2}' N.$, and lon. $33^{\circ} 19' E.$, extending a little to the E. of the line of coast, between which and the N. end of the high land of Zeitee is formed a small bay, in which a vessel may anchor in 7 or 5 fathoms sandy bottom, a little sheltered from N.W. winds; Mount Agrib bears from the anchorage W. by N., distant 23 m. The soundings gradually decrease as you approach the shore. Take care not to go too close to the Spit of Reef, which extends about $1\frac{1}{2}$ m. to the E. of the point.

The Egyptian coast, from Ras Shukhair, lies in a direction about N.W. by N., to lat. $29^{\circ} 0' N.$, preserving nearly a straight line, with a few small bays to the W. Along this coast the soundings decrease as you approach the shore; but on no account stand within 20 fathoms at night: even at that depth, if a vessel is going fast through the water, she may be on shore before another cast of the lead is taken; a navigator ought, therefore, to be on his guard, and measure his distance from shore to shore. **Ras Gharib**, 20 m. above Shukhair, is nearly opposite Great Jehan Peak (on the Arabian coast). The native pilots are excellent in judging distance from shore, and when to tack of a dark night. Captain Moresby was of opinion that they may be implicitly trusted in the navigation of the Gulf of Suez; and that a commander of a ship has little else to do than to see his ship properly worked. The Arab pilots have so long and often been accustomed to work up and down the sea, that they may be expected to have a thorough knowledge of its localities.

Ras Gharib Light, in lat. $28^{\circ} 21' N.$, lon. $33^{\circ} 7' E.$, is a fixed White Light, at 165 ft. above sea, visible in clear weather 20 m. The Light-house, an iron column supported by three stays and painted Red, stands on a cape close to the sea, but about 4 m. to the S.E. by S. of the cape marked Ras Gharib on the charts.

The outer dangers of **Shab Khoswan Reef**, on the Arab coast, bear N. $\frac{1}{2}$ E., distant 14 m. from this Light.

Mount Agrib, or **Ahkrab**, is the most conspicuous mountain on entering the Gulf of Suez; it has a high conical shape, and stands pre-eminent among a lofty range on the Egyptian coast. It can be seen 100 m. distant, is about 8,000 ft. high, though generally said to be 10,000 ft. high, and lies in lat. $28^{\circ} 7' N.$, and lon. $32^{\circ} 52\frac{1}{2}' E.$

ZAFARANA POINT LIGHT, in lat. $29^{\circ} 6' N.$, lon. $32^{\circ} 40' E.$, and 50 m. to the S. of Suez,

is a valuable help to the navigation of this Gulf, as that cape is so prominent and was (before the erection of Zafarana Light-house) a dangerous land-fall to vessels proceeding up the Sea of Suez. The Light is *fired*, of the first order, 83 ft. above the sea, and visible 14 m. Patches of rock lie to the E. and to the N. of the Light; therefore it should not be approached within 2 or 3 m. The coast, at the back of the Light-house, has some lofty peaks; to the S. of that new land-mark it recedes and forms a deep bight. Soundings off the Cape are about 15 fathoms at 3 m., and 30 fathoms beyond 5 m.; and then 30 to 35 fathoms across the sea towards **Hummum Bluff** and **Gad Mahlab**. (See page 28.)

Ras Abooderaj, is a prominent cape, 15 m. to the N. of Zafarana. Coral reefs extend off it about $1\frac{1}{2}$ m.; thus, with the reefs off Metameh on the opposite coast, narrowing the channel of the Sea of Suez to little more than 7 m.; the depths across are between 30 and 40 fathoms. The high land of Abooderaj is an useful mark to vessels proceeding down the Sea. To the N. of the cape, the shore line recedes to the N.W. for some 20 m., forming a deep bay; from the bottom of which the coast turns abruptly to the N.E. for some distance to **Ras Ataka**, or the Cape of Deliverance, which is about 4 m. to the S. of Suez.

Dangers in approaching Suez. Until this approach is better lighted and buoyed, large vessels must be cautious in running up to the mouth of the canal. Recent surveys have discovered shoals lying to the S.W. of Ras Mesalle, thus leaving a clear channel of little more than 3 m. between them and Ras Ataka.

The Newport Rock, discovered by the officers of H.M.S. *Newport*, though still ignored by many Arab pilots, is a patch of 13 ft., lying $1\frac{1}{2}$ m. to the S. of the light-vessel. It is marked by a buoy. Ships of great draught should adopt the central channel, called the **Narrows**, close to the W. of the buoy. (See pages 26 and 27.) Small vessels may run in N.N.E., for the light-vessel, over Ataka Flat, which has depths of 23 and 24 ft. at L. W.

Gad ul Markab, or Kad-el-Markeb, is the S. point of the harbour of Suez; a spit of sand extends out to the W. of it $\frac{1}{2}$ m. To the S. of Gad ul Markab, and 1 m. from the shore, there is a patch of sunken rocks, dry at L. W. In the centre of the bay is a small reef, bearing from Gad ul Markab about W. The best place for a vessel to anchor is off the Canal's mouth, in 4 or 5 fathoms; she will then be off the town of Suez, to the N. of the Light-vessel.

SUEZ town is in lat. $29^{\circ} 58' N.$, and lon. $32^{\circ} 33\frac{1}{2}' E.$ Provisions are plentiful and good; in the seasons, various fruits, such as oranges, pears, apples, and plums; also plenty of fine cabbages, lettuces, &c., may be had. The natives are civil and friendly to Europeans.

GULF OF SUEZ.—THE ARABIAN SIDE.

(VARIATION OF COMPASS AT SUEZ AND JUBAL STRAIT, $5\frac{1}{2}^{\circ} W.$)

Jubal Strait. The principal parts on the Arabian side are Ras Mohamed; Shab Mahmoud, and Shab Ali reefs.

RAS MAHOMED, the extreme point of the Sinai promontory, in lat. $27^{\circ} 49' N.$, and lon. $34^{\circ} 15' E.$, is an abrupt broken cliff, with a flat top; it is about 90 ft. high, and decreases in height to a low sandy plain, a little to the N. of the cape. In the centre of this plain stands a remarkable black hillock about 150 ft. high, having a large pile of stones on its top, erected by the crew of the surveying vessel *Palinurus*; it lies $2\frac{1}{2}$ m. to the N.W. of the cape, and is in lat. $27^{\circ} 45\frac{1}{2}' N.$, and lon. $34^{\circ} 14' E.$; it is the best guide at night to clear a ship of the S. point of Shab Mahmoud, as well as to point out the large anchorage between Shab Mahmoud and the reefs extending to the W. of Ras Mahomed. Close to the S.W. point of Ras Mahomed there is a low coral island, connected with the cape by a reef. To the W. of the cape $4\frac{1}{2}$ m., a reef extends off shore with no soundings close to it, or to Ras Mahomed; in one part of the reef extending to the W. there is a break, having a sandy bottom at 6 and 7 fathoms, but so full of sunken rocks that few vessels would attempt anchoring there. Do not approach Ras Mahomed too near in the night, as the white cliffs and land are not easily seen, though the black hillock is perfectly distinct. H. W. on F. and C. at 6 h., rise and fall 5 ft. Variation $5\frac{1}{2} W.$

Shab Mahmoud Reef, S. point, is W. $\frac{1}{2}$ S. from the extreme point of Ras Mahomed, distant $7\frac{1}{2}$ m., and E. $\frac{1}{2} N.$, distant 17 m. from the high part or centre of Jubal. The black hillock on Ras Mahomed bears from Shab Mahmoud about N.E. by E.; and about N.N.E. distant 14 m. from the S. and high part of Shadwan. On this extreme of the shoal there is a **beacon rock** 3 or 4 ft. above water. There are no soundings near the S. or W. sides of this shoal, but good anchorage on sandy bottom in 18 and 10 fathoms, to the N.E. and E.N.E. of the beacon rock. Soundings extend

to the N.N.E. from this rock and shoal to the reef off Ras Mahomed, having an opening of 2 m. This is excellent anchorage in N.W. winds, and can be easily made at night, by attending to the bearings given for the point of the shoal, or beacon rock, keeping the black hillock, when you anchor, bearing a little to the N. of N.E. by E., and Ras Mahomed nearly E., or a little to the S. of E. Should the night appear unfavourable for passing through the Straits, a ship may anchor here, and should on no account attempt to work through, if the light and island of Jubal cannot be seen. In light variable winds, a vessel gets through the Straits with less difficulty than in strong N.W. winds. **Shab Mahmoud**, from the beacon rock, extends to N.W. by N. 6 m. in length, making a slight curve to the W. of this bearing. There is a channel between Shab Mahmoud and the reefs off the main; but the N. entrance is too intricate, except with a fair wind, for ships to pass through. The reefs off the main land to the N. of Shab Mahmoud lie about 3 m. from the shore, and a N.W. course from the beacon rock, distance 12 m., will bring you to the entrance of the channel between Shab Ali and the main, in which there is good anchorage. If to the N. of the beacon rock, and standing towards the N. end of Shab Mahmoud, the S. high part of Shadwan ought not to be brought to the W. of S., whilst Ashrafi Light bears to the N. of W. by N.: you will then be $1\frac{1}{2}$ m. from the shoal; do not bring black hillock to the S. of E., until Shadwan E. end bears to the E. of S.

Shab Ali, an extensive shoal, 10 m. in length by 2 in breadth, whose W. reefs lie in the middle of the Straits, and contract the channel to $6\frac{1}{2}$ m. The S. point, which is broken into several small reefs, lies W. by N. $\frac{1}{4}$ N., distant 13 m. from the beacon rock; from Jubal Peak, N.N.E., $8\frac{1}{2}$ m.; and from Ashrafi Light about E. by S. 8 m. To clear the W. side of all Shab Ali reefs, do not bring Jubal Peak to the W. of S. Under the S. point, good anchorage in 15 or 20 fathoms is obtained; also between it and the reef off the main land, which here forms the entrance of the **Narrows**, a good channel 3 m. broad. When in a fair way to enter this channel from the S., Jubal ought to bear about S.W.; and the E. end of Shadwan S. $\frac{1}{4}$ E. This channel may be safely used in the daytime, as it affords good anchorage-ground throughout, and the water is smooth; the N. entrance is also capacious, but a good look-out must be kept when approaching the reef. To the N. of Shab Ali the Straits widen 10 m.; still off the Arabian shore there are some dangerous reefs and patches, called **Shab Jarah**, extending 3 m. from the coast, which is here a low sandy desert. On approaching this shore reef, keep the lead going. Should a ship decrease her water to 25, 15, and 10 fathoms, she ought to tack immediately.

Sheikh Riyah is a bay on the Toor side, so named from the tomb of a Sheikh. This anchorage is $5\frac{1}{2}$ m. to the S.S.E. of Toor, and affords excellent shelter for ships; there is a patch of rocks on entering the bay, which can be easily avoided; you anchor in 7 or 8 fathoms sandy bottom. These are all the dangers on the E. side of the Straits.

Two shoals, with 5 and 4 fathoms water, are marked on charts, to the S.W. of Shab Riyah, and to the N.W. of Shab Jarah. Therefore, we advise steamers to keep over towards the Egyptian coast, where all the lights are situated.

NAVIGATION OF THE GULF OF SUEZ. Great care is requisite in working between Shadwan and Toor, particularly in the night or in hazy weather, the channel, called the **Strait of Jubal**, being narrow and bordered by shoals on the E. side. Islands and shoals also bound its W. side, to the distance of 7 leagues from Shadwan; but, having now the excellent *Revolving* light on Ashrafi Reef, this is the safe side to work in during the night, as Jubal may be closely approached on its E. side. A ship bound up the Sea of Suez may pass Shadwan at any convenient distance; but when past this island, she ought not, in working, to stand into the open space between it and Jubal, nor so far over as to approach the dangers on the E. side of the channel. Having got abreast of Jubal, it will be prudent to make short tacks, keeping nearest to Jubal and its contiguous isles, to avoid the Shab Ali Shoals (or W. Shab, as it was formerly called) on the Sinai side, which lie about half-way between Ashrafi Islands and the E. shore. The breadth of the fair channel in this part is not above 5 m., which renders it dangerous to work here in the night. In passing along, a ship should not stand so far to the W. as to bring the E. end of Shadwan to bear to the E. of S.S.E. $\frac{1}{4}$ E., till Jubal Peak bears W.N.W.; on which bearing of the peak she may approach Jubal quite close, and until it bears S. by W. All dangers on the W. side of the channel will be avoided by keeping Ashrafi Light to the W. of N.W., whilst to the S. of it, and to the S. of S.E. by S. when to the N. of it.

Ras Mahomed Low Cape cannot be seen farther than 3 or 4 m., but there is no danger near it, the water being very deep close to the shore. In crossing over towards the Strait of Jubal, the first danger is the shoal with the Beacon Rock on the S. end of Shab Mahmoud, which bears W. from Ras Mahomed $2\frac{1}{2}$ leagues. If the weather has an unsettled appearance, a ship ought to keep plying betwixt the Beacon Rock Shoal and Ras Mahomed, unless she can weather Shab Mahmoud Reefs and get into the Narrows. There is no safe passage between Shab Mahmoud Reef and the main

land. In the day it generally blows strong, but moderate during the night. If at day-light Mount Sinai, or Jebál-et-Tor, is enveloped with clouds, the wind will assuredly blow strong that day; if the mountains be free from clouds, moderate weather will prevail. When the weather is moderate, a ship should stretch well up towards Jubal, and make several tacks across the channel at the entrance of the Strait before dark.

The Narrows, formed between the Shab Ali reefs and the shore-reefs, may be adopted, with great circumspection, when strong N. winds and a heavy sea prevent a ship from gaining ground in the main channel to the W. of the Shab Ali reefs, although the latter track (*the Strait of Jubal*) should always be followed when the weather will admit. In the Narrows the people have the advantage of rest in the night: if it blow too hard to be under-weigh in the day, by remaining at anchor, sails may be repaired if necessary, or any other work may be done. When anchoring in the Narrows, it will be prudent to give the reefs a small berth, to avoid detached pieces of rock, which might injure the cables.

TOOR, or EL-TOR, on the Sinai shore, is in lat. $28^{\circ} 14' N.$, and lon. $33^{\circ} 37' E.$ The water here is excellent and in plenty. This is the nearest point from which a traveller can proceed to Mount Sinai: the journey is performed on camels, and generally takes two days: the road is bad, winding a great part of the way through broken and precipitous ravines of rocky mountains, called Jebál-et-Tor. About $1\frac{1}{2}$ m. from Toor, at the foot of some low hills, is a square building or tower, at the foot of a large date-grove, which belongs to the convent of Mount Sinai: this grove of dates is watered by a large and clear spring of bitter and brackish water, which lies close at the back of the garden walls near the hills, and makes an excellent warm bath, its temperature about 95° , with a small building enclosing it. Abreast of Toor the sea is 17 m. broad.

Anchorage in Toor Bay may be had in 4 to 5 fathoms, sheltered by the reef off Ras Toor from N.W. winds; with Ras Toor Point N.W. by W., and the ruined fort on nearest point to the E., bearing N.E. by E. The reef off Ras Toor projects $\frac{1}{2}$ m. to the S., having a great surf on it at times. A ship coming from the N. should run close along the reef, until she open the town, and haul round its S. extreme; she may then anchor in any depth at discretion, from 8 to 5 fathoms, avoiding a coral patch of 3 fathoms, which is nearer to the E. shore, but only 4 cables to the S.E. of the S. tip of the reef of Toor Point.

Toor Sunken Reef lies $\frac{1}{2}$ m. off shore to the S. of Toor Point, and the same distance from the E. shore. The passage to the N. of it into Toor Bay is $\frac{1}{2}$ m. broad. The passage between it and the E. shore is $\frac{1}{2}$ m. wide. This reef is 1 m. long, N. by W., and S. by E., and has only from 6 to 10 ft. water on it in some places; a ship leaving the harbour may sail to the S. between it and the main, in regular soundings, by steering S. by W. along the E. shore; avoiding the 3-fathom patch which lies S. by E. from the anchorage. This is the channel generally used when *bound out*, as the winds are N. during three-fourths of the year. The N. channel is frequented by vessels *bound into* the harbour. When the sun shines, a green shade is reflected from the rocks, by which they may be discerned, and thus avoided. The depths in both channels are in general from 7 or 8 to 10 and 11 fathoms, regular soundings.

During the violent N.W. winds, ships bound to Suez are often obliged to take shelter in this port, where the drinking water is better than any place in the Red Sea; it is procured from three wells abreast the anchorage, which are about 200 yards from the beach; this water is slightly brackish, although much better than that of Suez. Good water may be found in a direction N.E. from Toor, distant about $2\frac{1}{2}$ m., situated in a very extensive grove of palm trees, where there are several wells, the water of which is pure and sweet. Several very fine hot mineral springs were found due north from the harbour, about 3 m. distant. Provisions, or other articles of refreshment, are not to be obtained. The town, which is situated at the N.E. part of the harbour, is inhabited principally by Greeks and Bedouin Arabs. Near the town lie the remains of a well-constructed fort. Variation, $5\frac{1}{2}^{\circ} W.$ **Tides.** The tide flows to $10\frac{1}{2}$ h. on F. and C. of moon, and rises 3 ft.

Mount Sinai. In a valley, at the foot of Mount Sinai, there is a large Greek monastery, where travellers are entertained with the utmost hospitality and goodwill; it is inhabited by twenty-five or thirty Greek and Russian monks of the Greek Church; they live in a state of celibacy, and never eat animal food. Mount Sinai, or Jebel Moosa, is 3,000 ft. above the monastery: the top of the mountain, is in lat. $28^{\circ} 30' N.$, and lon. $33^{\circ} 57' E.$ The Sea of Suez, except a very small portion about Hummum Bluff, cannot be seen from Mount Sinai; Toor, and all the coast of Egypt, being hid by Mount St. Catherine, which is a few hundred feet higher than Sinai, and lies 4 m. to the S.W. of it. The islands Tirahn, Senaffer, Shooshooh, and the entrance of the Sea of Akabah also, some distance up, can be seen distinctly, as well as the high mountains about Moilah, by which we fix the station of the Mount. From Toor to Cairo the Bedouins will convey letters or passengers in from three to five days. Boats from Jeddah, however, wishing to communicate speedily with

Cairo, generally used to land passengers or letters at a place called **Sherm Sheikh-Ahdeel**, on the N.E. side of Ras Mahomed; by doing this, they avoided strong N.W. winds in the Sea of Suez.

TOOR MIDDLE SHOAL is an extensive spot of shoal water in midway, on which in one spot, about W.S.W., 9 m. from Toor, there is less than 6 fathoms (and, indeed, a cast of $3\frac{1}{2}$ fathoms was once reported about 1 m. further to N.W.), and on each side of it 26 or 30 fathoms, sometimes 35 and 40 fathoms, which is the general depth in the centre of the Sea of Suez.

The Arabian Coast, from Toor Harbour, takes a direction N.W., for 30 m., to the dangerous reef, **Shab Khoswan**, in lat. $28^{\circ} 34\frac{1}{2}'$ N., a few miles to the N.W. of Great Jehan Peak. To the E. of this line the coast has a few small bays, affording indifferent anchorages, one under Great Jehan Peak, the other about 6 m. above Toor, near a few withered and blighted date trees; but they are both bad spots for anchoring, the water being deep, little sheltered, and close to the shore. At the latter place are those famous written mountains, **Jebel Mokhtab**, one of which produces musical sounds, a source of superstition to the natives. From Toor to Jehan, an extensive range of hills comes close down to the sea, and the shore is bold to approach, till you get to the N. of Jehan Peaks, which are two pointed hills. A shoal, nearly 2 m. across, with 6 to 8 fathoms, lies from 3 m. to 5 m. off this Arabian shore, about 10 m. to the S. of Jehan Peaks. **The Great Jehan Peak**, which is the highest and N. one, is in lat. $28^{\circ} 32\frac{1}{2}'$ N., and lon. $33^{\circ} 15'$ E.; it bears from Mount Agrib about N.E. There is a lagoon of some extent between Jehan and Shab Khoswan.

SHAB KHOSWAN REEF, dangerous at times, lies 3 m. off Ras Sherateeb, a low sandy point, with which it is connected by shallow water, having a passage only for boats. A narrow rocky ridge, with only $3\frac{1}{2}$ fathoms, water over it, has been found to extend as much as $6\frac{1}{2}$ m. from Ras Sherateeb. From its outer extreme Ras Gharib Light bears S. $\frac{1}{2}$ W., distant 14 m.; and Great Jehan Peak bears about E.S.E., 9 m. There is a good anchorage under its S.E. end, in 6 and 7 fathoms. Care should be taken not to stand too close in, as the water shoals suddenly. This danger ought to be avoided at night, by keeping well over on the Egyptian coast; there are 25 fathoms at $\frac{1}{2}$ m. to the W. of the shoal. W.S.W. from Shab Khoswan, the Egyptian coast is 9 m. distant. From the lagoon opening, near the S. end of Shab Khoswan, the coast extends N. by W. for 7 m. to **Ras Sharateeb**; thence due N. 12 m. to Ras Burdessa, under which point there is anchorage.

Ras Burdessa is a low, sandy and bushy point, in lat. $28^{\circ} 52'$ N., lon. $33^{\circ} 9'$ E.; the coast forms a slight bay to the E., between Burdessa and Sherateeb to the S., with soundings of 10 and 15 fathoms near the shore. The next place of anchorage is Ras Selima, or Zelima, 14 m. to the N.N.W. of Burdessa. Ras Zelima is a low, sandy point, close to the hills, which here again extend to the beach; this anchorage is well sheltered from N.W. winds. W.S.W. from Ras Zelima the Egyptian coast is 21 m. distant.

RAS HUMAHM, or Gad Mahlab, is the next cape; it is a low, sandy point, in lat. $29^{\circ} 14'$ N., off which, about 3 m. to the W., is shoal water. There is a good anchorage on the S. side of this cape; Hummum Bluff, lies close to the shore, to the E.S.E. of the anchorage. **Jebel Hamahm**, or **Hummum Bluff**, in lat. $29^{\circ} 10'$ N., and lon. $32^{\circ} 58\frac{1}{2}'$ E., is 1,500 ft. high, and shows a precipitous cliff nearly overhanging the beach; at the foot of this hill there is a hot salt-spring, and two hot caverns, called Humahm ul Faroun (the baths of Pharaoh). The surveying vessel, *Palinurus*, was at anchor off Hummum Bluff, sheltered from the N.W.; the wind suddenly shifted to the S. and blew a hard gale, which she rode out with three anchors ahead, topsail-yards and top-masts down, and not a cable's length from the shore; her tender was driven on shore, and was a total wreck in a few hours. This will show how necessary it is, when anchoring from N.W. winds, not to hug the shore too close, in case of a shift of wind, which is very sudden, at times unexpected. To the W.S.W. of Gad Mahlab, 14 m., and on the Egyptian shore, is **Zafarana Point Light-house**, in lat. $29^{\circ} 6'$ N., lon. $32^{\circ} 40'$ E.

Ships ought to be cautious at night in working between the reef off Ras Humahm Cape and Zafarana, the distance across being only 10 m. When Hummum Bluff bears E.S.E., it is on with shoalest and most extensive part of the reef off Ras Humahm Cape. A mile or two to the S. of Zafarana Cape there is a deep bay, in the N. part of which a ship may anchor in 6 or 7 fathoms, with Hummum Bluff bearing E. by N. $\frac{1}{2}$ N., well sheltered from N.W. winds by the shoal water of Zafarana. A range of high hills lie a few miles to the W. of Zafarana, which terminate abruptly a few miles to the N., between which and the high land of Abooderaj, further to the N., there is a long, flat desert or valley between the mountains. It was at this spot, say the Arabs, that the Israelites passed over the Sea, which is here 12 m. broad.

Ras Metamer is a low, sandy point and spit on the E. shore, in lat. $29^{\circ} 26'$ N.; there is a good anchorage to the S. of this cape, in 11 or 12 fathoms sand. Ras Metamer bears from Hummum Bluff N.W. $\frac{1}{2}$ N.; and **Jebel Sedour**, or **Barn Hill** (a capacious hill on an elevated range, in lat

29° 40' N., and lon. 32° 55' E.), bears from Ras Metamer about N.E. The sea, abreast of Metamer, becomes contracted to 9 m., between the S. end of the high land, or cape of Abooderaj, and Metamer. From Metamer to Suez the shore is bounded by a coral reef, which extends in some places from $\frac{1}{2}$ m. to 1 m. from the land. Caution is requisite in approaching the shore at night, as the coast is low, and deceitful as to the distance; from 23 fathoms in some places is close to the shore. The S. point of Abooderaj Bay is bounded by the high hills of Abooderaj, which come close to the sea, and are bold and safe to approach, having 30 fathoms close to the beach. In the N. part of this Bay the water is more shoal, and affords good anchorage from N.W. winds. Adaga or Ataka Point is the N. entrance of the Bay, and runs out a considerable distance, forming a low point not seen till very close to it. **Ras Sedour**, a low, sandy cape, on the E. side, is in lat. 29° 36' N.; a small, sandy spit, runs off the cape; there is good anchorage on its S. side, in 12 and 15 fathoms, sand. On the N. side of this cape there are two small reefs, about $1\frac{1}{2}$ m. from the shore, and 3 m. from the cape.

Ras Messale is the next cape on the E. shore; it lies in lat. 29° 49' N. Two miles to the S. of this cape a narrow spit of sand extends off shore to the S.W. At $2\frac{1}{2}$ m. to the W.S.W. of Ras Messale some sunken rocks have lately been discovered. Therefore, vessels had better not anchor, except in the Bay, 3 or 4 m. to the S.E. of the cape. Between Ras Messale and the opposite shore, near Point Ataka, is only 6 m, having 15 and 20 fathoms in mid-channel. Care should be taken on approaching Ataka Point, as a spit of sand extends off it between 2 and 3 m. to the N.E.

Suez is further described in Section First, pages 26 and 27.

THE CENTRE CHANNEL, OR STEAMER HIGHWAY.

In Section I., pages 27 to 30, we have given directions for navigating the steamer-highway from Suez to Aden, or the Outward-bound voyage. Those which follow are from the remarks of Captains Moresby, Elwon, and Rogers, of the Indian Navy; with the more recent observations of Navigating Officers on board H.M. Indian Troop-Ships.

After clearing out of the Gulf of Suez, the navigation of which is now rendered so easy by numerous lights, the highway of the Red Sea is marked by the Brothers Islets, Dædalus Light-house, Jebel Teer, and other islands.

The Brothers have been recommended as the site for a light-house.

Dædalus Shoal is a small reef nearly in the centre of the sea; it lies in lat. 24° 55' N., and in lon. 35° 52' E. In 1863 a *fixed* light was exhibited 200 yards within the S.E. extreme of the reef, 61 ft. above H.W., and visible 14 m. There are no soundings alongside the shoal, and, to obtain observations, the surveying vessel *Palinurus* hooked on to it during the warm weather in the Red Sea, when its waters are much lower than in the months from October to May. A sand-bank of several feet high is formed on this reef (but is yearly washed away when the sea rises, and the wind blows strong). This is the only reef in the centre of the Red Sea, and is called by the natives **Abdul Kheesan**. It is 6 cables in length N.W. and S.E., and $2\frac{1}{2}$ cables wide.

The **Centre Channel**, between the outer extremities of reefs extending off the Arabian and Abyssinian shores, is very deep throughout. The surveyors sounded from 70 fathoms to upwards of $\frac{1}{2}$ m., or 260 fathoms, without getting bottom. More recently, soundings of 500 to 1,000 fathoms were taken by H.M.S. *Cyclops*; the greater depth was found midway between Jiddah Harbour and St. John's Island.

This channel, in the parallel of Jiddah, is 110 m. broad: from 20° of lat. on the Arabian side to 19° of lat. on the Abyssinian side, its breadth is about 70 m. From the outer extremity of the mud soundings on the W. part of Doharab (the S. end of Shab Farsan) until soundings are again obtained on the E. part of the Dhalac banks, the extent of deep water is not much more than 40 m.; and to the S. of Camaran, the deepest part of the channel, where ships could not obtain soundings, is reduced to a narrow strip by the sand and mud soundings obtainable off both sides of the sea; and from thence the narrow strip of deep water in an irregular form may be traced to the Straits of Bab-el-mandeb.

Proceeding to the S. through **Inner Channel on Arabian side**. This inner channel, from Jiddah to Leet, is formed by numerous sunken rocks, breaking patches and reefs, the S.W. of which is called **Gad Amaze** (Kadd 'Omais) and the coast is bound by coral reef. It is generally narrow until past Kishran, from whence is an open channel to sea, bound on the N. by Gad Amaze, and on the S. by the N. part of an extensive bank of reefs and islands, running from thence to the S. as far as Camaran, abreast of Zebayer Islands. Within the above space the inner channel is only 2 and 3 m. wide, has very deep water, with some patches, and very indifferent anchorages, being mostly stopping-places for boats, formed by breaks in the coast-reef or rocky patches off it, affording

little protection from the sea, even for baghalahs. There are no towns on this part of the coast, nor any supplies procurable.

From Leet to Camaran the coast is generally bordered by coral reef, and the inner edge of the outer reef is formed by extensive sunken rocks, dangerous patches, and small islands, with deep water close to them, between Leet and Serain Island; but, after passing the latter, it is generally clear, with good anchorages, though there are many sunken patches in it. A little N. of El Burk and Nahood, the channel is contracted to 1 and 2 m. by a bank, called Ohm Kergan, the N. part of which is very shoal; but there are 2 and 3 fathoms on other parts. After passing this bank, which is extensive, the channel becomes comparatively open.

The best entrance from seaward is to the W. of Leet; there is one, between Loban and Entookfash Islands, over the tails of the banks; a third between Okbahn and Camaran Islands (page 170). The S. entrance to the inner channel is between Camaran Island and Ras el Bayath, being no more than 700 yards wide between the latter and a reef which extends towards it from the island. The boats sail night and day through these channels.

The principal places within this space are Leet, Coomfidah, Gheesan, Loheia, and Camaran.

Inner Channel along the African side. This channel is similarly bound as that on the opposite side, and ends at Dhalac Islands and Bank to the S. The Island *Bolhessoo*, which bears N.E., distant 25 m. from Howakel, may be considered the S. entrance. The N. entrance of this channel may properly commence at *Macowa*, though this description extends it to *Khor Dullow*, from whence to Suákin the channel is generally from $1\frac{1}{4}$ to 3 m. wide, except in the neighbourhood of Saláka, Duberdabb, and Ras Roway, where the limits are $\frac{1}{2}$ m. From Macowa to Saláka, which is the most intricate part of the channel, there are generally soundings, but in all other parts deep water.

From a little below Suákin the channel becomes wider, passing outside the extensive shoals in a bight of the coast S. of Ras Mugda, which is about 30 m. below Suákin, and soundings will generally be obtained; but, excepting the harbours on the coast, there are few places where ships would prefer to anchor, the bottom being generally rocky, with great overfalls. In most of the anchorages N. of Suákin, it is advisable to moor the ship; and in many places it may be considered prudent to lay out, in blowing weather, the stream-anchor on or near the weather beach.

There are several entrances to this channel from seaward, the best of which, N. of Suákin, is off Sheikh Baroud. There is also a wide one N. of the Dhalac Banks, but several patches are in it, most of which will be seen by a good look-out. There are also channels out to seaward over the Dhalac Bank, to the N. of Untontore Island, but none below it, excepting the S. entrance, bounded by Howakel and Dhalac Island Reefs, already described. The principal places on the Abyssinian coast in the above space are Suákin, Khor Nowárat, and Massowah.

Passes from centre of sea to the Inner Channels. In the channels amongst the islands and shoals there is very deep water to the N. of 17° N. lat.; but from thence to the S., from the N. extremities of the Dhalac Banks on the Abyssinian side, and Sháb Farsán and Islands on the Arabian side, soundings may be obtained; those parts being composed of very extensive banks, with shoal water and moderate depths, intersected by narrow channels of mud with deep water.

In prosecuting the survey, the H.E.I.Co.'s sloop of war *Benares*, was, from the nature of the duty, amongst all these islands, reefs, and banks, where the depth of water permitted, excepting that part on the Arabian side to the S. of Abou Laad Island, and also immediately above and below Sabyar and Gootna Islands, which part was found too dangerous. Captain Moresby said, "I think few navigators will frequent the channels amongst the islands and reefs on the broadest parts of the banks to the N. of 17° of lat., on account of the deep water and great distance of either coast; which render it probable that they would not be able to procure anchorage before nightfall, and therefore would be obliged to heave-to amongst the reefs and islands for the night. But we used to make fast to the islands by hooking a grapnel on to the reef off them, and haul the vessel close up, and send the stream-anchor on shore. Twice, the wind falling light, the eddy laid the ship's broadside close to the reef. On one occasion we veered clear, and on another set the sails to keep her off, but at last were obliged to get the anchors on board, and heave-to for the night. The country boats make fast to the islands and reefs, either by means of a boat, or by a man swimming with the end of a hawser and a hook, from the vessel to the reef, and hooking on to the rocks."

"Should it ever become necessary to make use of these channels on either side, it will be requisite to make certain of the vessel's situation, so as to be at a moderate distance from the reefs at daylight, in order to have as much of the day as possible to run across with; and a sharp look out must be kept for the sunken patches, some of which can only be seen in clear weather, and when the sun is in the opposite direction to a ship's course (*see* end of Jiddah, Chapter IX.), and even then they will not get clear through before dark, without a six-knot breeze. The country boats, small

and great, frequent these channels. In fine weather, with moderate fair winds, they steer from Jiddah direct for Harmeel or Roméa Islands, on the N. part of the Dhalac Banks, on the Abyssinian side of the sea. But, if the wind is Southerly, they keep their wind on the port tack, and pass in through the channels on the African side as the wind permits, and for the nearest of which they run direct, on the appearance of bad weather."

"On fresh, fair, or foul winds, they use the Inner Channels. If going from Jiddah to Suákin, or even to Massowah, they either cross to pass into the inner channel to the S. of Macowa Island, or through one of the channels between the reefs S. of it, and return in a similar manner. The boats bound to Massowah also frequently sail down the Arabian coast to near Kotumbul Island; then quitting the inner channel, at daylight they proceed across the reefs, passing the Simmer Islands, and when clear of the reefs they run across to make Roméa Island with N. winds, but with S. winds they keep their luff, and cross in amongst the numerous islands on the Dhalac Banks to Massowah; from whence they return in the same way to Jiddah. When we were running between the reefs to seaward, from Dahret Simmer Island, we saw in the forenoon a merchant boat coming in to the coast from the centre channel; and she must have made the outer reefs early in the morning. The ship and boat crossed each other with a half-fathom patch of rocks between them. We had the sun at our back, ~~which~~ was favourable to us, but not to the boat, and there was much glare."

WINDS AND WEATHER IN THE CENTRE CHANNEL.

The N.E. monsoon, entering the Red Sea, becomes a S.E. wind; and, being repelled by the high land of Africa into a narrow strait, blows with considerable force, and rather inclining towards the Arabian coast; for it is probably stronger there than on the Abyssinian side, even in the lowest part of the Sea. These S.E. winds generally begin to decrease in force after passing the Harnish and Zoogur Islands; and as they approach the wider part of the Sea, are gradually lost in light winds along the outer reefs on the Arabian side, or turn towards the banks and islands on the African side, becoming E. and N.E. winds, and gradually blending with the prevailing N. winds in that part.

These S. winds commence in October, and subside in the latter part of May. They blow with most force from October to the end of January, and in some months extend so far as Suez, but most commonly do not reach Jiddah. They are frequently succeeded by light variable or N. winds in the 18th degree of latitude. From Feb. to the end of May they do not blow so strong as in the preceding months, and are frequently succeeded by N. winds for several days, particularly in Feb., at which time the native boatmen avail themselves of the opportunity to quit, and reach the S. ports of the Red Sea.

The weather, from Oct. to Jan., in the lower part of the Sea, is generally thick; a haze obscuring objects, especially the sandy coast-line, until pretty near. Along the outer reefs, squalls and rain are frequently experienced in Nov. and Dec. From Feb. to May the weather is unsettled, in April and May particularly. Below the Zebayer Islands, fresh squalls from the E. are sometimes experienced, with heavy clouds of sand, and sometimes rain. These are doubtless identical with the sand-squalls from N.E. and E., felt at Aden after sultry weather.

In the beginning of June the Southerly monsoon is succeeded by N.W. winds, which, in the lower part of the sea, seldom blow with great force. They continue pretty regular during June and July; but, in Aug. and Sept., are frequently light and variable. In the latter month there are sometimes light S. winds or calms. During this time the weather is frequently very thick and hazy, particularly on the Arabian side; and the Abyssinian shore is consequently much the most pleasant, and is considered the most healthy.

On the evening of 20th October, the pilot drew our attention to the *Pleiades*, which the Arabs call *Tryer*, *Thurayá*, or *Tsuraiá*, and which was then seen low down in the E.; he informed us that, on its first being seen in that quarter in the evening, it indicated the commencement of the Southerly winds. The latter part of April, in the evening, the *Pleiades* set, when he said that light variable winds would prevail for forty days, after which those stars will be again seen in the E. in the morning, when the N.W. winds commence, and continue until *Pleiades* again sets in the morning in the beginning of Sept., when there will be light variable winds for forty days, after which the Southerly winds commence again, when it is seen in Oct. early in the evening.

Winds and Currents in the S. part of Red Sea. At Mocha, and throughout the S. part of the Red Sea, the Southerly monsoon predominates about two-thirds of the year, commencing in Oct. or Nov., and ending in May or June; then the N. winds set in, and continue nearly four months. During strong S. winds, the current frequently sets through the straits with rapidity into the Red Sea. With these winds, the atmosphere is usually red and fraught with vapour; a great haze prevents objects from being seen, unless very near. About the F. and C. of moon, the S. winds are

sometimes checked, and replaced by breezes from the N., which continue two or three days, and greatly cool the air. The currents at such times are liable to change, and run in opposition to the wind; but in general they set with it in the Red Sea; and also in the Straits, or in the gulf outside, they mostly run with the wind.

In the gulf outside the Red Sea, between the coast of Arabia and Africa, Easterly winds usually prevail from the early part of Oct. to May; then the Westerly winds commence, and continue about six months. Near the Arabian coast the monsoon from the W. sometimes begins more early, about the middle of April; the Easterly winds setting in on the same coast early in Oct., with a current running to the W. As a general rule it may be observed, that from Oct. to May or June, the wind is from the Eastward in the gulf *outside the Straits*, and about S.S.E. *inside*, in the *S. part* of the Red Sea. During the other six months, it is from W. *outside*, and N.W. *in the Red Sea*, from June to Oct. This rule is not applicable to the *N. part* of the Sea, for the Northerly winds prevail there during nine months of the year, particularly in the Gulf of Suez, and frequently blow strong: at all times in this gulf S. breezes are of short continuance. The strong N.-Westerly winds that prevail in the Gulf of Suez seldom blow to the S. of the Brothers. And the strong S. winds, which prevail at Mocha, seldom reach above lat. 15° or 16° N.; for about Jiddah, and half-way up the Red Sea, the winds are often light and variable. It is almost impossible to beat up against the Northerly winds to Suez in June, July, and Aug. Ships bound to that port should endeavour to reach it before the 1st of May, or more early if possible; and although, when bound outward, they may get down the Gulf of Suez at any season, it is prudent if bound to a distant port that they depart from Suez by the 25th or 30th of Aug., to enable them to clear the Straits of Bab-el-Mandeb in Sept., before the E. winds commence in the gulf outside. Ships leaving the Straits, after the 10th of Aug., should keep near the Arabian coast, to avoid the strong current, which then sets to the W.S.W. and the W., at the rate of 2 or 3 m. an hour, along the African shore, from Ras Feelook to Zeyla.

Winds and Weather in the Inner Channels. In the inner channel, towards Massowah, on the Abyssinian side, Northerly winds, inclining to land and sea-breezes, seem most prevalent all the year round; but most probably are, as in all other parts to the S., light and variable in Aug. and Sept., when there are also frequent calms; and Southerly winds are by no means common. From the month of Aug. to Oct. is generally fine weather, but from Nov. to the end of March appears to be the rainy monsoon upon that coast. In April the weather was cloudy, and fine in May, June, and July; but between 19° and 20° of lat., in these months, several hot winds and fresh land-squalls are experienced; the *Panther* was driven from her anchorage at Massowah, June 20th, 1805, by a partial simoon or land-squall, from the N.W.

There are similar winds and weather on the Arabian side; and, though land and sea-winds are more frequent in March and April, the land-squalls from the E., in the lower part of the Sea, occur, as at Aden, in April and May. From May to July, when the surveying ships experienced land-squalls from the W., on the Nubian coast, there was at that time thick, hazy weather; and at night there were heavy dews on the Arabian side opposite, about Jiddah.

THE TIDES AND CURRENTS.

Along the shores of the Red Sea, in some places a rise and fall of the water was observed; and at a few parts of the shore, and in some of the narrowest channels, a tide was seen to flow; but at all other parts it was imperceptible.

Within the Straits of Bab el-Mandeb, on both sides of the Sea, when the ship at anchor had her head to the N.W., the tide was rising on the shore, when it *appeared* as if the flood ran to the S.; but it is to be observed, that the ship was wind-rode, the tide-stream not being of sufficient force to counteract the effect of the wind upon her hull and rigging; and it should also be noticed, that the abrupt turn of the coast at the entrance of the Sea causes an eddy in the neighbourhood of the Straits, though not immediately within the small one. The tide flows into the Red Sea through the narrow channel of the small Strait, at the same time that it is rising by the shore.

On F. and C. of the moon, it is H. W. at Bab-el-Mandeb at 12 h. 0 m. At Ras Macowa, on the Abyssinian coast, nearly opposite to Mocha, the tide, though hardly perceptible, appeared to flow in from the open sea, and it was H. W. about 12 h. 30 m., and the rise about 2 ft. At Amphilla the motion of the tide was not perceptible, but the rise was about 3 ft., and the time of H. W. about 12 h. 40 m. At Ras Mejarmila, on the Arabian coast opposite, the rise was about 4 ft., and the time about 1 h. 10 m. At Camaran Island, the rise at the Equinox was 2 ft. 10 in., and the time of H. W. 10 h. At Dissee Island, on the Abyssinian coast opposite, a branch of tide flows perceptibly S. into Goob Ducnoo; and it runs with considerable rapidity on the E. side of Dhalac, through the contracted channel, over a rocky bottom, into Doobelloo harbour, and also into Gubet Sogera (Soghra),

on the W. side of the island Dhalac, through the narrow gut that forms the entrance, where it is H. W. at 1 h. 0 m. At Dissee Island the rise is $3\frac{1}{4}$ ft., and H. W. at 1 h. 0 m. At Massowah the stream of tide was hardly perceptible, but the rise was 3 ft., and H. W. at 1 h. 0 m. At Loheia, on the Arabian side, nearly opposite Massowah, there was no perceptible motion of tide in the offing, but the rise was 3 ft., and H. W. at 1 h. 30 m. in the inner harbour. At Badour, on the Abyssinian coast, the rise of tide was 1 ft. 6 in., and H. W. at 1 h. 15 m. In Jiddah harbour we observed no motion of tide; there was a rise and fall of water, but so very irregular, that we were unable to obtain correct data. In Jan. and Feb. the greatest rise or fall on the springs was about 2 ft.; but in the hot months there is less at L. W. by 3 ft. than in the cold season; showing how the N. winds cause a considerable depression.

The Currents in the Red Sea seem to be entirely governed by the winds; during the prevalence of S. breezes they run to the N., and with N. winds to the S.; they increase according to the strength of either, as there was little set or none at all during the prevalence of light variable airs previous to the setting in of the S. winds.

In Nov., in a strong S. wind, the current sets to the N.W., about 1 m. per hour, off Jiddah harbour. In Dec., on the Arabian side, below that place, it sets to the N., $1\frac{1}{4}$ m. per hour. In Nov., off the Outer Reefs on the Arabian side, it sets along them N.N.W., 1 m. per hour. In Feb. there appeared to be no current in the neighbourhood of Jebel Teer, during light winds. In Aug. the current in the S. part of the Sea sets to the S., 1 m. per hour.

In the beginning of Oct., 1832, there seemed to be no current; and afterwards, on the N. part of the Sháb Farsan banks, it was setting to the N., about $\frac{1}{4}$ of a knot per hour, amongst the banks and islands on the Outer Reefs. The flow of tide and current through the several deep-water channels was so irregular, and intermixed so much with eddies from the numerous islands and shallows, that it was quite impossible to ascertain it with any correctness.

WINDS, CURRENTS, AND PASSAGES, BETWEEN SUEZ AND JIDDAH.

The Winds from Suez to Jiddah, during the whole year, are mostly Northerly, blowing with great violence at times, but generally moderate with changes of the moon. During winter months, from Dec. to April, Southerly winds at times prevail for a few days, occasionally blowing fresh; more especially in the Sea of Suez, where they freshen at times to a moderate gale, blowing home to Suez, but lasting only a short time. In these months, in the Sea of Suez, Westerly gales are not unfrequent; they are called by the natives the Egyptian winds, and from their violence are much dreaded. On the Arabian coast, near Jiddah, both to the S. and N. of it, the winds from N. from N.E., and E., at times blow with great violence during the winter months, bringing off clouds of dust from the land.

The Currents in the Red Sea, from Jiddah to Ras Mahomed, are various all the year; no particular direction can be assigned to them; it may be generally remarked, they set with the prevailing winds, which, when strong, cause a current of sometimes 20 and 40 m. a day. If the wind continues long in the same quarter, they sometimes set against it, which can be proved by the short, deep swell, in a N.W. wind, against which the best-sailing vessels make nothing for the first and second days, when all at once they unexpectedly get to windward. Southerly winds, which sometimes prevail from Oct. to May, generally bring a current from 20 to 30 m. a day with them.

After a N.-Wester has been blowing, and light winds prevail, a current generally sets to the N., more especially on the Arabian coast. Therefore, the Arabian side, with the N. winds, is the best to work on, and not the Egyptian coast, which the old navigators preferred, on account of its being more clear of shoals. On the Arabian coast a vessel will be able to take advantage of the wind, if she is near the reefs and coast; as the wind almost always bears several points more from off the land as the night advances, and in the early part of the morning; and it comes well from seaward during the day; but this is not the case on the Egyptian coast, when N., N.E., and E. winds prevail. At times, from Nov. to March, these last cause a strong current to the W., and as the wind becomes light it sets back again to the E.

Passages. The average time a ship takes to reach Cosire from Jeddah depends so much on circumstances, that no definite period can be stated: it is seldom performed in less than 10, or longer than 20 days; in the native boats 25 and 30, sometimes more. A ship ought to have good sails bent on quitting Jiddah for the N.; and, if she is proceeding to Cosire, should work up on the Arabian side as far N. as **Namahn Island**, in lat. $27^{\circ} 6' N.$, before she attempts to cross the sea to Cosire; for should she make to leeward of the port, it may take her days to work up a small distance. On quitting Cosire for Suez, with a strong Northerly wind, a vessel ought to stand over to the Arabian coast; she will nearly fetch Moilah, in lat. $27^{\circ} 40' N.$, and lon. $35^{\circ} 27' E.$ Having

worked up 30 m. to the N. of Moilah, she may then stand over to Ras Mahomed, leaving the Arabian coast at night: as she proceeds along, the N. winds will veer to the N.N.E. out of the Sea of Akabah, which enables a vessel to reach Ras Mohamed, keeping a close luff to the islands bounding the head of the Sea.

From what has been said respecting the currents, it will be essential to ascertain the vessel's situation correctly, taking latitude by the stars which pass the meridian, as also correcting the longitude at sunset by sights for the chronometers, of some of the numerous stars at twilight, which, from the clearness of the atmosphere in this Sea, are always to be seen. After taking observations at sunset or later, a vessel ought only to stand back to the shore or reefs, half the distance she stands out, and never come nearer than 10 m. off the reefs at night, in case of a current. A vessel cannot do wrong by keeping the Arabian side on board, but should not go too close with a light wind or heavy swell, or if there is much probability of the wind failing: in case it blows hard, she can take advantage of the anchorages, having a native pilot on board. These men know nothing of the Egyptian coast, so they could take a ship only to one or two principal ports on that side, which is essentially necessary, should a vessel be in distress, or requiring some refit.

The Arab Pilots being acquainted with the reefs and anchorages of the Arabian coast, from eyesight, are always able to take a vessel among them with safety; whereas a stranger, not acquainted with the localities, would feel alarmed in navigating among the reefs; but they are all safe to approach, taking the precaution to be on the fore-top-sail-yard with the native pilot, and keeping a good look-out for sunken rocks, the eye, and not the lead, being the only guide. The different shades of green on the coral rocks will show the depth of water and the spot to anchor on; when at anchor care should be taken of a shift of wind, on the vessel forging a-head, to haul in the slack of the cable, to prevent its taking turns round the rocks; in which case it is with difficulty cleared again.

The hire of a native pilot from Jiddah to Suez is about 25 or 30 German crowns, besides his food. If possible, do not take a very old man. These pilots have little inclination to go aloft, and are generally indolent; it is necessary to keep them on the alert, and never place too great a dependence on them: they know nothing when in the midst of the sea and out of sight of land.

WINDS AND CURRENTS IN RED SEA, BY COMMANDER T. E. ROGERS, OF THE INDIAN NAVY.

Winter Months. From the beginning of Oct. to the end of April, which period may be called the winter months, from the Straits of Bab-el-Mandeb to Jebel Teer, the wind may be said to blow constantly from the S., with the exception of an occasional day or two of Northerly winds on the F. and C. of the moon; but two months frequently pass without any change of wind. The current generally takes the direction of the wind 15 or 20 m. per day, particularly that from the N.; the Southerly winds having, as it were, heaped the waters in the upper part of the Sea; from this cause, also, I imagine it is, that a set is at times found against the Sputherly winds, on the decreasing of a strong breeze from that quarter.

The effect of the S. wind in raising the water, and the N. wind in decreasing it, very plainly appears in Jiddah Roads; with the former a small boat can go straight from the anchorage to the shore, whereas with the latter, in the same direction, a succession of dry banks appear, having only a circuitous and narrow channel.

From Jebel Teer to lat. 19° or 20° , the winds at the same season are variable, blowing nearly as much from the N. as the S., that particular wind predominating as you approach the N. or S. of the above limits. The currents here, in general, set with the wind, but at times are found to run across the sea as much as 20 m. in 24 hours; occasionally, but not often, a set to windward is experienced of 12 or 15 m. in the same time. The winds here do not, in general, blow so strong as the prevailing ones above and below these limits.

From lat. 21° to 27° , at the same season, the Northerly is the prevailing wind, but half a moon seldom passes without having the wind one or two days from the S., more particularly from the end of Nov. to mid-March. The currents here are much the same as between Jebel Teer and Jiddah; the Southerly wind is less frequent as you approach the N. extreme of these limits. Strong Northerly winds, of two or three days' continuance, are often experienced here in these months.

From lat. 27° to Suez, the wind is almost constantly from the N., and, unless during the months of Dec., Jan., and Feb., seldom interrupted by that from the S. The currents run with the wind, but are not so strong as those experienced more to the S. The N.-Wester seldom blows with violence here for more than 12 or 15 hours at a time, and, from what I have experienced, I should say it does not blow so strong in the summer as in the winter.

Summer Months. In June, July, Aug., and Sept., the Northerly winds prevail, with more or less strength, throughout the Sea from Suez to Bab-el-Mandeb, with little interruption; occasional slants from the land are met with, particularly in Aug. and Sept.; and a vessel that sails fairly will average 35 m. a day, in working from Mocha to Suez in these months.

Leaving Mocha in the end of July, the *Euphrates* worked to Suez in 36 days; leaving Mocha in the end of Aug., she completed the same voyage in 32 days. On both these occasions, from leaving Mocha until she passed the Strait of Jubal, she never had a second reef in the topsails. The water was in general smooth; the current generally against, sometimes with her, the difference giving an average of $3\frac{1}{2}$ and 4 m. daily against her during the voyage.

In opposition to Horsburgh, who says the wind in the Sea of Suez generally blows strongest during the day,* I have found in working up on three occasions, once in June, another in July, and again in Aug., the contrary to be the case, never, on any occasion, having found a second reef in the topsails necessary during the day, whereas at night I have generally been obliged to double reef the topsails, and at times take in the mainsail.

Throughout the Sea of Suez a hazy horizon is generally a sign of a breeze; but it is not always its precursor. The same remark applies to a light fleecy cloud hanging above the tops of the Toor or Sinai mountains, as seen from the southern entrance of the Strait of Jubal.

During the winter months, throughout the Sea, the Northerly wind is generally accompanied by a dry atmosphere, and the Southerly wind by one that is damp. A change of wind is thus often indicated some hours before it takes place, or before any other sign is visible.

During the summer months the atmosphere is generally damp throughout the Sea; but the sky overhead is so clear that a planet can often be seen at noon-day.

In working up the Sea to the Strait of Jubal, I think the Arabian coast is the best to keep on; and in this opinion I am strengthened by the practice of Turkish ships, which, in their way from Jiddah to Cosire, sight the island of Tirahn before they venture to cross over, so much do they dread making the Egyptian coast below Cosire. This is 60 m. farther to the N. than I think a fair sailing ship need go, and the practice is sometimes attended with provoking consequences, as I have known one Turk reach Cosire before another who left Jiddah 13 days earlier, in consequence of the former getting a S. wind below Cosire, which to the other was a foul wind, from his being so far to the N.

The wind in the Red Sea seldom blows in squalls, but its gradual rise is often very rapid in the N. part.

In the months of Dec., Jan., and Feb., a ship sometimes will carry a fair wind from Mocha to Cosire, and make the passages in 6 or 7 days. I never heard of this being done from Cosire to Mocha, unless in the summer months.

ADDITIONAL DIRECTIONS FOR THE NAVIGATION.

The track usually taken by H M. Indian troop-ships and other large steamers is, after leaving Suez, to keep the W. shore on board, as being the clearest, passing Zafarana Light-house from 3 to 5 m. distant, and carefully checking the distance by bearings, as judging distances by eye in the Red Sea is more than usually deceptive. From Zafarana Light they steer so as to pass Ras Gharib Light about 4 or 5 m. distant, still keeping the W. shore on board; passing W. of the $3\frac{1}{2}$ -fathom patch, Toor Middle Shoal, between Ras Shukhair and Toor, the high land of Zeiti is made on the bow, and a course shaped for Ashrafi Light-house. The position of Mount Akrah in this vicinity used to be depended upon for bearings, and the mountain can generally be seen at night; but Ras Gharib Light now supersedes it.

There is no difficulty for steamers in the Strait of Jubal by night or day, if in passing the Ashrafi Light-house its distance is carefully determined by the change of bearing. This precaution in taking each fresh departure is absolutely necessary; as, between determining the distance by bearing, and judging the same by eye, an error of 3 m. in 10 has been found by different observers.

Entering the Strait of Jubal from the S. it is better to pass Shadwan Island close (1 or $1\frac{1}{4}$ m.),

* This account, occurring in the old Directions for Entering the Sea of Suez, by Captain Kydd, does not mention the time of year, but merely states, "*In the day it generally blows strong, but moderate during the night.*" Captain Rogers speaks of the summer months only. My own experience of S.E. winds during winter months, at the lower part of the Red Sea, is, that they blow strongest in the day (notably in the afternoon), as sea-breezes do. I might also mention, that in the passage from Aden to Bombay, in the N.E. monsoon, the wind is fresher in the forenoon (generally between midnight and noon), just as the land-winds on the coast of India are. Notes of such concurrences as these—capable of being frequently taken by the many intelligent master-mariners and engineers who now ply between Europe and Asia—will be of service to the physical geographer when investigating the phenomena of periodical winds.—EDITOR.

and then steer a course to pass the out-lying reef of Abou Nahas and the Horse-Shoe, about 3 m. distant, until Ashrafi Light is sighted. Shadwan Island has been seen on several occasions when 35 m. distant.

The Brothers may be safely approached within a short distance; on the centre of the N. and larger one is a high pole with cage-top, in lat. $26^{\circ} 18' 53''$ N., and lon. $34^{\circ} 50' 44''$ E.

The Dædalus Reef, which has a good light on it, may be passed on either side, and a course is then * shaped to pass 4 m. W. of Jebel Teer. St. John's Island makes in the distance like a hay-cock. The S.W. Zebayer Island is passed on the same side, and at the same distance as Jebel Teer; the track then lies inside Jebel Zooger, passing between it and Abou Eyle, keeping on the side of Jebel Zooger, as a reef runs off the N.W. side of the W. Abou Eyle. A course is next shaped to pass Mocha, about 6 or 7 m. distant, and thence to Perim.

The doubtful danger marked in the Small Strait of Bab-el-Mandeb is not believed to exist, the Malabar having passed close over the spot five times without discovering anything of the kind. It is of importance to know this, as the island side in this channel is the safest, the Oyster Rock with its outlying reef not being very easily seen at night.

In this route it is considered many additional lights are wanting. A better one is required at Suez. Ras Gharib now shows a good light. A light would be useful on Shadwan, and also on the Brothers, which latter are low, and not seen under ordinary circumstances more than 2 m. at night. On Jebel Teer one might be favourably placed on low land on the W. side; also on Abou Eyle, where it might be built on the reef running off the N.W. side of the W. rock. And lastly, a light-vessel moored outside the shoal patches which extend 4 m. off Mocha would be of great assistance in rounding the shoals at night.

Currents. As a general rule the currents are not strong. With a strong S.S.E. wind, lasting about three days in Dec., when between Jebel Teer and Jebel Zooger it ran with the wind at the rate of $1\frac{1}{2}$ m. per hour, but in ordinary weather, such as is generally experienced, the velocity does not usually exceed $\frac{1}{2}$ m. an hour. On two occasions in the vicinity of the Brothers (near Shadwan), a W. set of $\frac{1}{2}$ m. per hour was observed, lasting about twelve hours. The greatest set noticed in the Gulf of Suez was $\frac{1}{2}$ m. per hour to the E.

STRAIT OF JUBAL. The following observations, on the tides and currents in Jubal Strait, were made by Captain Henry D. Grant, R.N., while conducting the operations for the recovery of the treasure from the wreck of the P. and O. Company's steamship *Carnatic* in Dec., 1869, on the Abou Nahas Reef.

The rise and fall of the tides on all the banks between Jubal and Shadwan Islands are much affected by the direction and force of the wind; they range from 4 to 6 ft. at F. and C. The direction of the tides (the ebb running to the N.W. and the flood to the S.E.), as shown on the chart of the Strait of Jubal, is correct, but within the distance of 2 m. from the reefs and Shadwan Island they are uncertain, setting in towards the reefs and circling round them.

For the space of nearly a month a steady N.W. current was experienced passing between Shadwan and Abou Nahas, and setting past the Saul Islands. Captain Alli Suggery, of H.H. the Khedive's steamship *Tor*, states that it sets out again N. of Jubal Island. The strength of this current depends on the age of the moon; and at change it runs about 2 m. an hour. On three occasions, when at anchor for a week or ten days, in Dec., off Abou Nahas, the vessel was riding with her head to the E.S.E., and a strong N.W. wind blowing the whole time. Strong under currents were found on the N. side of the Reef.

As the Ashrafi is a first-class light, and can be seen clearly when to the S. of all the reefs, with attention to its bearing, and Shadwan Island always in sight, no vessel ought to be endangered. Vessels should pass the Ashrafi Light-house at a distance of from 1 to 2 m., and then a course should be shaped to give the Horse-Shoe and Abou Nahas Reefs a berth of from 3 to 4 m.

WINDS AND WEATHER. The following has been collected from various sources:—

Hurricanes or heavy storms are almost unknown in the Red Sea, but fresh gales and close-reefed topsail breezes are of constant occurrence.

Between Suez and Jiddah, Northerly winds prevail all the year round. From Dec. to March inclusive these winds blow fiercely, moderating at F. and C., with an occasional Southerly breeze foretold by damp weather. During these months, Westerly gales occur in the Gulf of Suez, and as far S. as the Dædalus Reef, accompanied at times by dense fogs of dust; violent N.E. winds on the Arabian coast, near Jiddah, are also felt.

Between the Strait of Bab-el-Mandeb and the parallel of 17° N., Southerly winds are experienced in the middle of the sea from Oct. to May, prevailing from Nov. to March, blowing

* See the Editor's own experience and remarks, at bottom of page 29.

strong from the S.E. in Jan.; about Dec. these winds bring hazy weather, with squalls and rain; after Feb. they blow with less strength, and are frequently followed by Northerly winds for several days. Rain falls between Oct. and March.

In March, April, and May the weather is unsettled, with Easterly squalls, and sometimes rain.

The N.W. winds commence in June, seldom blowing strong, and becoming light and variable in Aug. and Sept., with occasional Southerly winds, long calms, and hazy weather in the latter month. Squalls come off the land with hazy weather between April and June; while in July, August, and Sept., the winds are usually light and variable, with frequent long calms; land-breezes are occasionally met with then on the Arabian coast.

On the coasts of this region land and sea-breezes are experienced, but Northerly winds prevail all the year round.

WORDS USED IN DIRECTIONS FOR RED SEA AND GULF OF ADEN.

Balad	A Town or Village.
Bander or Bunder	A Harbour or Anchorage.
Bar or Bahr	The Land.
Bayat	A Shoal, dry at L. W.
Gadd or Gad (<i>Kadd</i>)	A Shoal.
Goobet or Gubet (<i>Ghubbet</i>)	A Gulf.
Gurn or Garn (<i>Karn</i>)	A Horn, or Point.
Guttah (<i>Ki'ah</i>)	A Patch of Rocks.
Hassar	A Rock.
Jibbel (<i>Jebel</i>)	A Hill, or Mountain.
Juzeerat, or Jezirat (<i>Jazirat</i> or <i>Jazirah</i>)	An Island.
Kebter (<i>Kebireh</i>)	Great.
Khor or Core (<i>Khaur</i>)	An Inlet.
Kinasat	A Shoal or Sand-bank.
Mirza, or Merza (<i>Mersá</i>)	An Anchorage.
Nakhil	A Date-grove.
Rak, Rakat, or Rejjat	A shallow, flat Bank, extending off shore; or a Ripple.
Ras (<i>Rás</i>)	A Cape, or Headland.
Sail, or Sale (<i>Seil</i>)	A Torrent.
Segeer (<i>Saghireh</i>)	Small.
Shab, or Shaab (<i>Sha'b</i>)	A Reef, or Shoal.
Shurm, Sherm, or Shrum (<i>Sharm</i>)	A Creek, or small Cove.
Waddy (<i>Wádi</i>)	A Valley, or River.

CHAPTER IX.

THE RED SEA—ARABIAN SIDE.

PERIM—BAB-EL-MANDEB—MOCHA—HARNISH AND ZOOGUR—HODEIDAH—ZEBAYER AND JEBEL TEER—CAMARAN—LOHEIA—COMFIDAH—LEET—OUTER REEFS—SHAB FARSAN—WUSALIAT—ABOOLAAD—JIDDAH—YEMBO—CAPE BAREDI—HASANI AND MASABIH ISLANDS—MOILAH—TIRAHN ISLAND—GULF OF AKABAH—RAS MOHAMED—TOOB—SUEZ—NAVIGATION.

(VARIATION AT BAB-EL-MANDEB, $4\frac{1}{2}^{\circ}$ W.; AT JIDDAH, 5° W.; AT SUEZ, $5\frac{1}{2}^{\circ}$ W.)

The Directions for the S. half of the Red Sea, from the Straits of Bab-el-Mandeb to Jiddah, were extracted from a Memoir written by the late Commander Thomas Elwon, of the Indian Navy, to accompany his portion of the survey. For the part N. of Jiddah, the directions were written by Commander Robert Moresby, by whom that part of the survey was executed. The longitudes were determined by chronometric measurements, and have lately received important corrections.

FROM BAB-EL-MANDEB TO MOCHA AND JEBEL TEER.

The Straits of Bab-el-Mandeb are 14 m. wide. The mountain ranges of Africa and Arabia converge towards them, both inside and outside the Red Sea, thus acting as a funnel to increase the strength of the N. and S. winds and the currents also in their seasons. **Perim** or **Meyoon** is a bare rocky island, about 4 m. long by $2\frac{1}{2}$ broad, rising 200 ft. above the sea. On its S.W. side is a good harbour, nearly $\frac{1}{2}$ m. broad, with 6 and 7 fathoms water, and a muddy bottom. The harbour forms in two branches, and that to the N.W. appears the best. There is difficulty in getting out of this place in S. winds, and warping out might be found necessary. A bank extends off the N. of Perim $\frac{1}{2}$ m., with 4 and 5 fathoms on its outer edge; the steamer *Evora* got aground in $2\frac{1}{2}$ fathoms, said to be nearly $\frac{1}{2}$ m. to the N. of the N.W. cliffs of Perim.

Perim Light, in lat. $12^{\circ} 40'$ N., lon. $43^{\circ} 28'$ E., is a white light of the first order, *Revolving* every minute; it is placed 1,100 yards within the N.E. bluff; and being elevated 240 ft. above H.W., is visible 22 m. in clear weather.

THE SMALL STRAIT is nearly $1\frac{1}{2}$ m. wide, with 10 or 12 fathoms in mid-channel in its N. part; 14 to 16 in its centre; and 11 to 13 fathoms between Fisherman or Pilot Rock and the S.E. extreme of Perim. Shoal water in rocky patches extends N. of Pilot Rock to the lower Cape of Bab-el-Mandeb. But N. of that Cape ships may, during S. winds, anchor in 6 or 7 fathoms, with Pilot Rock seen over the low Cape, and the N. end of Perim Island W.S.W., or the light about S.W. by S. There is sheltered anchorage during N. winds in 6 and 7 fathoms, in a small bight to E. by S. of the Pilot Rock, and about 2 or 3 cables from it.

Navigation. Ships entering the **Red Sea**, usually take the Small Strait, which has moderate depths for anchorage. In running for the entrance, the depth decreases quickly from 30 and 28 to 18 and 10 fathoms. With a fair wind keep in mid-channel, or nearer Perim; there is no danger, although the depths are irregular from 17 to 7 fathoms coarse sand. At the N. part of the Strait, nearer the main than to the island, lies a small bank, having on it 7 or 6 fathoms, whereon a few casts may be got, but there is no danger. Off the N. part of Perim Island about $\frac{1}{2}$ m. is a shoal spit of 24 and 17 ft. **Anchorage.** Having passed through the Strait, and uncertain of reaching Mocha with daylight, with the wind inclining to blow strong from S., you may shut in the entrance of the Strait, and anchor to the N. of Cape Bab-el-Mandeb, near the French settlement of Sheik Syed, where the water is smooth, with Perim Light about S.W. by S., and Pilot Rock just behind the low point of Bab-el-Mandeb. It may be difficult to bring up, with the Strait open, or farther N. towards Mocha. The navigator must be on his guard not to overshoot Mocha in the night, for currents sometimes set strong to the N. with S. winds.

THE LARGE STRAIT is 9 m. broad. Perim is its N. boundary; the Brothers Islands and Ras Sejam mark its S. limits. Throughout this strait, no soundings are obtainable, except with the deep-sea lead near Perim and towards the Abyssinian shore. There is no anchorage in the Large

Strait, except near Perim Island, or between the Brothers and the main land. With a steady fair wind, the Large Strait may be adopted, for a ship may run through in the night, when it is imprudent for a stranger to proceed through the Small Strait. In passing through the Large Strait, a ship should borrow towards the Island Perim, where she may anchor if the wind fail, and prevent being carried over to the Brothers when the current is running to the S. If passing through the Large Strait in the middle or early part of the night, it will be prudent to haul in to the E., and heave-to until daylight, keeping near the Arabian shore, in from 12 to 24 fathoms: this is preferable to anchoring when blowing strong, as a ship is liable to lose her anchor.

Having entered the Red Sea by either Strait, steer along the Arabian coast, coming no nearer than 10 or 11 fathoms, on account of a small bank 8 or 9 leagues to the N. of Cape Bab-el-Mandeb, having 9 fathoms close-to.

Zee Hill, 18 m. N. of Perim Light, is a small but remarkable rocky peak, like a gunner's quoin, close to the beach. This is the only hill by the sea between Bab-el-Mandeb and Mocha. Shoal water runs off it; and, to the S., there are two reefs lying off shore, extending 6 m. to the S. from Zee Hill. Soundings along this coast are pretty regular, and the lead is a good guide in approaching it. Between Zee Hill and Mocha, but nearest to the former place, there is a small bank (reported by former navigators, but not on the Red Sea charts,) having 9 fathoms close outside of it. There is also said to be a shoal between Bab-el-Mandeb and Zee Hill; therefore never go under 12 fathoms along this shore, except you have an Arab pilot.

In passing Mocha, the lead should always be used to determine the distance off shore; if the hand-lead gets bottom, you are too near and should haul out a little.

MOCHA, in lat. $13^{\circ} 20' N.$, and lon. $43^{\circ} 12' E.$, is enclosed by a wall with several forts and towers, occupying a space about $\frac{1}{4}$ m. square; many of the buildings within it are in ruins. The houses generally are large, and built with stone: there are also several mosques with lofty minarets, and being white, they have an imposing effect from sea. It has several batteries towards the sea; the centre battery is by the jetty; and a little to N., opposite the old factory, is a five-gun battery; beyond that is the N. fort, on a sandy spit to the N.W. of the town. The south fort is in a ruinous state, upon a sandy beach to the S.W. of the town. This place has an extensive bazaar, and is well supplied with beef, Abyssinian sheep, fruits, and vegetables; very good bread may also be had, but there is no biscuit. The water is brackish and dear. The population is now less than 2,000, but formerly was 20 times as great, before Aden rose to such importance. Hodeidah, 100 m. further N., has supplanted Mocha as the principal commercial depôt of Yemen.

Mocha Roads, to the W. of the town, have a depth of only 3 to 6 fathoms, and the bottom is sand, not good holding-ground. There are three rocky shoals to be avoided in sailing in or out, and in anchoring. Firstly, the numerous shoal patches, lying $3\frac{1}{4}$ m. to S.W. of the town, which prevent ships approaching nearer than 4 m., whilst the grand mosque bears to the N. of E. Within these, and 2 m. W. of the town, lies a small shoal with 13 and 14 ft.; and between this and the town is Mocha Roads.

A light-vessel is proposed to be placed off Mocha.

When approaching Mocha from the South, steer along the Arabian coast about N.N.W., keeping without the depth of 12 fathoms, to clear the sand and rocky banks which project from Mocha Roads. Vessels entering must bring the Grand Mosque to bear E. by S., or the North fort bearing E., before they approach within $2\frac{1}{4}$ m. of the shore; and then steer in on that course, and anchor in 4 or 5 fathoms. No vessel should attempt to enter from the S. without a pilot; as a long narrow shoal lies 1 m. W. of the South fort. Passing inside the banks can only be attempted by a small vessel, and not without a pilot. After passing Zee Hill, keep along the coast in 7 or 6 fathoms, and when the N. fort bears N.E. by N. steer for it, until the South ruined fort and mosque are in one. With these marks on, about a N.E. course, you can steer in until within 1 m. of the S. fort, but do not attempt getting near the landing-place without a pilot.

PASSAGE FROM MOCHA TO JEBEL TEER. A N.N.W. course, for 40 m., from the Small Strait having placed the vessel from 5 to 7 m. off Mocha; steer thence N. by W. 52 m. to Abou Eyle islets, passing about 1 m. to E. of them. If the Large Strait be used with a fair wind, a N. by W. $\frac{1}{4}$ W. course for 44 m. places the ship off Mocha; then steer as above to pass well to the E. of Moosbedjerah and to round Abou Eyle. The rocks and islets between Harnish islands and the Abyssinian coast, make the Arabian shore a preferable navigation. The land is low and sandy, but the soundings are regular, and the lead will be a good guide between Mocha and Ras Zebeed, which is abreast of Zoogur island; but no shelter from strong winds is found till you reach Khor Goolafugger, 80 m. to the N. of Mocha.

HARNISH ISLANDS are nearly 40 m. to N.W. of Mocha. Great Harnish is 10 m. long, N.E. and S.W., and about 3 m. in breadth. Its central peak is highest, and all are volcanic and barren;

grass grows in the valleys, in which plenty of antelopes are found. The W. side is very steep-to, but along the E. side the soundings are pretty regular, affording anchorage against N. winds, with a bottom of sand and rock, just to the S. of Haycock island, which lies off the N.E. end of Great Harnish. Little Harnish, 3 m. to N. of Haycock, is also very high and rugged. Off its N. and E. sides there are several rocky islets and sunken rocks.

The **S.E. Rocky Islet** of the Harnish group lies 5 or 6 m. E. by N. from Sule Harnish, which is the S. high island. This S.E. rocky islet stands about 10 m. to the S. of Mooshedjerah.

Mooshedjerah is a small, low island, 3 m. to E. of the N. point of Great Harnish. It is safe to approach quite close, except on S.E. side, where the P. and O. steamer *Alma* was lost in 1859; but navigators should avoid the islets and rocks about 9 m. to the S. of Mooshedjerah.

JEBEL ZOOGUR, the highest island in the Red Sea, nearly 10 m. in length from N. to S., has its centre in lat. 14° N. Several lofty, barren hills, with sharp peaks, formerly volcanoes, form its high land. The W. peak is highest, more than 1,000 ft. There is anchorage to S. of this peak during N. winds, in 7 to 9 fathoms, sandy bottom, inside of Sandy Peak islet, the passage between which and Zoogur has 7 fathoms. Anchorage in strong S. winds, in 7 to 10 fathoms, with smooth water, may be found to N.W. of the highest peak, on the N. side of the prominent, rocky, W. cape of Zoogur, in lat. $14^{\circ} 2'$ N. Here the S. winds blow in gusts from the island, but the water is smooth. There is no protection from S. winds on the Arabian coast opposite, except on the N. side of Ras Mejarmila, more than 80 m. from Zoogur.

Abou Eyle are three islets, standing together out of the sea, about 1 league off the N.E. points of Jebel Zoogur. They are 13 m. from the Arabian shore, and the fair channel is fully 3 leagues wide. It was usual for pilots to take steamers to the E. of the Abou Eyle, but practised navigators now pass between them and Jebel Zoogur. From these islets, a course N.W. by N. will take a vessel to the W. of Zebayer islands and of Jebel Teer. (*See end of Chapter VIII.*)

The **Islands and Rocks between Ras Billool and Jebel Zoogur**. The islands comprising this group are mostly volcanic hills, of a dark and barren aspect, with rocky eminences in fanciful or romantic shapes, covered with a loose, granular black, brown, or sandy-coloured earth and ashes, or strewed with pieces of sharp rock. The principal, as before stated, are the Zoogur and Harnish Islands, which are surrounded by many small ones of various heights, to which appropriate names have been given, according to their different shapes. In some of the largest, the remains of craters are very evident, having all the appearance of being originally high-peaked islands, reduced to the present saucer-shape by internal explosions; and the neighbouring smaller islands and rocks to the E.S.E., the S., and S.W. of Harnish, being of similar formation, leads to a belief that they have been formed by the same means. No sunken patches were discovered between any of this group from Ras Billool to Zoogur, all the dangers being above water, so that vessels running either up or down this sea can pass through any of these channels during the day with safety; but it is better not to attempt to pass through the smallest ones beneath the N.E. of the Mah-heb-bakah Islands; or through the 9-fathom channel between the N. part of Great Harnish and Haycock Island off it, for fear of baffling winds.

ZEBAYER ISLANDS are 40 m. W.N.W. from Hodeidah; their S.W. island, called Centre Peak, bears N.N.W. $\frac{1}{4}$ W., 65 m. from Abou Eyle islets. Jebel Zebayer, the E. island, and largest of the group, is about 600 ft. high, and has three remarkable hills; the S. one is conical, the N. one is like a barn. Some low rocks awash lie nearly 3 m. to the N. of the N.E. tip of this island, and no soundings would be got at 1 m. off them. Therefore it is best for steamers to pass to the W. of Zebayer group, although the fair channel to N.E. of them has a width of 15 m. The nearest land (20 m. from the Zebayers) is **Rasher**, in lat. $15^{\circ} 10'$ N., lon. $42^{\circ} 33'$ E., a low, sandy islet, surrounded by a reef; this is 3 m. to the S. of Ras-al-Bayath, a sandy cape, which is 33 m. N.W. by N. of Hodeidah.

Quoin Rock, the N. islet of the group, in lat. $15^{\circ} 12'$ N., lon. $42^{\circ} 4'$ E., stands 12 m. to N.W. of Jebel Zebayer. **Haycock Islet** stands about 4 m. to S.E. by E. of the Quoin, and 8 m. to N.W. by N. of Jebel Zebayer. A **Sunken Rock** lies 6 m. to the S.E. of Haycock, with the E. extreme of Jebel Zebayer bearing S.; therefore, ships must take care not to pass too near the E. sides of the Zebayer group; the fair channel between them and the shoals off Camaran is 7 leagues wide.

Centre Peak is the S.W. island of the Zebayer group; its S.W. point is in lat. $15^{\circ} 1\frac{1}{4}'$ N., and lon. $42^{\circ} 10'$ E.; it is pretty high and steep-to. There is a passage between it and the large island; but all vessels should pass outside.

Soundings. Close to the W. of the Zebayer group the sea is very deep, and the deep-sea lead could not get bottom. But, although the soundings are a complete blank on the charts, both to S. and to W. of this group, there is reason to believe that, at 15 or 20 m. from the Zebayers, a continuation of the soundings on the Great Dhalac Bank would be found, with so little as 30, and perhaps 20 fathoms

JEBEL TEER, in lat. $15^{\circ} 32\frac{1}{2}'$ N., and lon. $41^{\circ} 50\frac{1}{2}'$ E., lies W. by N., distant 28 m. from Okbahn, and N.W. by N., 34 m. from Jebel Zebayer. This island is nearly of a circular shape, being about $1\frac{1}{2}$ m. from N. to S., and $1\frac{1}{2}$ m. broad, with 50 and 60 fathoms close to it. Its height is 900 ft. above the sea-level, and visible at 40 m. in clear weather. From the base it has a gradual ascent for $\frac{1}{2}$ m., where a range of hills, about 100 yards high, commence and terminate in a steep, rocky bluff, on the S. end of the island. From the top of this range is another gradual ascent to the peaks, which are about 100 yards in height. The largest peak is of a brown colour, and the other forms a beautiful cone, when seen from the S. and W. They appear to be of volcanic origin. There is a small, sandy patch, on the W. side, where landing may be effected; but there is no anchorage. Captains have reported it as sometimes sending up smoke by day, with flame by night. No soundings are obtainable near it with ordinary deep-sea line. The nearest land is Kotama Island, which bears E. by N. $\frac{1}{2}$ N., 26 m. from the Jebel. (*See* remarks at page 30.)

There are three names for this island: the Indians call it Jebel Teer, or hill of birds; the El Shoorrees of Sohar, near Muscat, Jebel Dokhan, or hill of smoke; and the Arabs and Abyssinians Jebel Sebain, or hill without anchorage. About $2\frac{1}{2}$ leagues to the W. by S. a depth was found of 297 fathoms, water; and at 1 league further to S.W., you will get 50 fathoms, and less, on the tail of the Great Dhalac Bank.

Caution. Sailing vessels must be warned that dangerous shoals, with patches of 2 and 3 fathoms, lie about 35 m. to W.S.W. of Jebel Teer. Other shoals encumber the sea between them and the E. islands of the **Great Dhalac Bank**, which Bank has not been thoroughly examined, and ships had better avoid it.

COAST OF YEMEN, FROM MOCHA TO LOHEIA.

Mersa Fejeerah, about 16 m. to N. from Mocha, is fit only for boats in less than 4 fathoms, to the S. of which the coast projects a little, and in some degree breaks off the swell in S. winds. Between Mocha and this place the soundings are regular. Seven miles further N. is the village of **Mousa**, where good water may be obtained; it may be known by a small white mosque, on its point. To the N. of Mousa, $4\frac{1}{2}$ m., is the village of Cocha, or Khauka. Sh'haree is also a small village, where good water may be procured: it is about 9 m. N.N.W. from Mousa, and may be known by a small, white mosque, on a cape, forming a small bay, about $1\frac{1}{2}$ m. to the N.W. of it, called **Gubet-el-Hamar**. The soundings being regular along the coast from Mersa Fejeerah, a vessel in want of water may anchor in any convenient depth off the said places to obtain it.

Ras Miltonah is about $11\frac{1}{2}$ m. N.W. from Sh'haree, and 41 m. N. by W. from Mocha. From Miltonah, the Little Harnish and Abou Eyle are distant about 5 leagues; and to the N. of it, to the distance of 2 m., there are three small rocky patches on which the sea breaks. This cape is in lat. $14^{\circ} 0'$ N.; the E. side of Jebel Zoogur being 16 m. W. of it, the soundings deepening gradually from the coast, and the deepest water between is 99 fathoms. Three small pyramidal hills, called the **Three Sisters**, or **Jebel Mousa**, are near the coast, between Mersa Fejeerah and Mousa. Seven m. N. of Ras Miltonah is **Ras Zebeed**, off which is a small shoal, on which the sea breaks, and about 1 m. to the N.E. of it is an excellent spring of fresh water, emptying itself into the sea. The rushes about its mouth are easily distinguishable from the anchorage off it in $4\frac{1}{2}$ fathoms, and there are also some trees and bushes in its neighbourhood, by which it may be known. Jebel Zoogur Peak bears from this anchorage W. by S.; and it is to be observed, that this being an open coast, if there is any surf on the beach, it will be difficult, and even dangerous, to attempt getting water here at such times. **Khor Goolafugger** is an inlet of the sea, running in for some 10 m. to the S.S.E., round Ras Mejarmila, which is 40 m. to the N. of Ras Miltonah. Some shoals lie along this coast. Vessels should not go in under 7 fathoms. One Shoal of 5 fathoms was found, amongst soundings of 20 and 28 fathoms, about $7\frac{1}{2}$ m. to S.W. $\frac{1}{2}$ S. from Ras Mejarmila.

Ras Mejarmila, a low, sandy cape, forming the W. side of the inlet of Goolafugger, and situated 12 m. to the S. of Hodeidah, affords shelter against S. winds in 5 or 6 fathoms, with the extremes of the cape bearing S.W. and S.E. A Shoal, 3 m. long, lies in a N. and S. direction, and between 2 and 3 m. to the W. of Ras Mejarmila. Ships must pass outside and to the N. of this shoal, and haul in for Mejarmila N. point, when it bears to the S. of S.E. by E.

HODEIDAH, in lat. $14^{\circ} 47'$ N., lon. $42^{\circ} 54'$ E., now the chief port of Yemen, is a large fortified town, with lofty buildings, but not so extensive as Mocha, though it has supplanted that place as a trading port, and the chief mart for coffee. Fresh provisions can be procured in the bazaar, and there is plenty of good water, which the natives will bring off in their boats. The trade is principally in the hands of Banyans. Small vessels will find shelter at Hodeidah from N. winds, about $1\frac{1}{2}$ m. to W.S.W. of the Grand Minaret, in $3\frac{1}{2}$ fathoms at L. W.: this position will be nearly

1 m. to the S.E. of the sunken rocky patches which lie 2 m. to W. by N. of the Grand Mosque. Large ships must anchor outside these sunken rocks, in 4½ fathoms, with Minaret bearing E. by N., and Fishing Point (sandy) N.E.; but there is scant shelter for large vessels during S. winds, except what is afforded by Ras Mejarmla, which is 4 leagues off.

Ras Jedeer is a low, sandy cape, 5 m. to N.W. of Hodeidah. About 2 m. to W. of it there is a patch of 2 fathoms, with 3 fathoms near it, to the N.W., and midway between it and the cape is a rock. Four miles further N. is **Ras Keteeb**, the extremity of a point or tongue of land, forming a bay or inlet to the S.E., which has depths of 4 and 5 fathoms, but the entrance is not well sounded.

Ras-el-Bayath and **Ras Essah**, about 30 m. to N.W. by N. of Hodeidah, are the N.W. and S.E. capes of the promontory which forms the S.E. side of Camaran Bay. To the E. of Ras Essah there is a bay of the same name, where a ship may anchor in 8 to 5 fathoms, sheltered from N. winds; but she must quit it on the appearance of the wind coming from the S. or W. From Ras-el-Bayath round Ras Essah, the shore is bordered by a reef steep-to; and nearly 4 m. S. by W. from the former is a low island, or sand-bank, called **Rasher**, surrounded with a reef, and with 14 fathoms between it and the main.

CAMARAN ISLAND, situated to N. of Ras-el-Bayath, is 12 m. in length, N. and S. It is generally low; on the N. there is swamp and jungle, but on the S. there are some small hills. Date trees are seen here and there by groups of fishermen's huts; turtle abound; pearls are found on the banks. Camaran village and bay are halfway up the E. side of the island, where shelter from all winds is found. The entrance to this excellent harbour, between Ras-el-Bayath and the S. end of Camaran, is narrowed to less than 4 cables, but is easily entered with a fair wind. The depths are 4 to 6 fathoms by the island reef, and from 8 to 11 fathoms, mud, in the channel; the greatest depths being towards the sandy cape. Wood and water are procurable. The S. end of the island bears N.E. by E., 21 m. from Jebel Zebayer.

Loheia is a large, walled town, about 30 m. to N. of Camaran Bay entrance, but a ship must not attempt to get there without an Arab pilot. It has an excellent bazaar, where cattle and poultry, flour and vegetables, are procurable. Large ships anchor 3½ m. to S.W. of the town, in 5 or 6 fathoms, on the N.E. side of Humreek Island. (See also **Humreek**, at page 170.)

Okbahn Island, low and sandy in its centre, with a hill at its N.W. end, and a bluff at the S., is 11 m. to the N.W. of the W. extreme of Camaran. Between these islands there is a 2-fathoms shoal; and, still further to seaward, there is a 4-fathoms shoal, which bears S., and is 7 m. from Okbahn, and is 17 m. to N.E. by N. from Jebel Zebayer; and 15 m. to the N.W. of Rasher Islet.

KOTAMA ISLAND, in lat 15° 41' N., lon. 42° 16' E., standing 22 m. to the W. of Loheia, and 26 m. to the E. by N. of Jebel Teer, is rather high, but without water or inhabitants. It is the outermost of a number of islands off this part of Arabia, amongst which there are navigable channels, but their intricacy renders a pilot necessary. There is a shoal, with 3 fathoms, about 2 m. to the W. of Kotama; and another about 20 m. off, bearing S. by E. This last is the shoal mentioned as lying 7 m. to S. of Okbahn.

OUTER REEFS BETWEEN CAMARAN AND LEET.

The edge of the plateau of soundings takes a nearly straight direction of N.W. by N. from Kotama for 93 m., to Sail Macowa, the most N. of the islands, standing out towards the centre of the sea, on the Bank which is called **Shab Farsan**, (from an island of that name, the largest of the group). There are dangerous patches some 6 or 7 m. to the N.W. of Sail Macowa. Then occurs a space which has not been sounded at all. Onwards to the Wussaliat Islands, in lat. 17° 40' N., and lon. 40° 55' E., numerous shoals, more or less dangerous, stud the plateau wherever it has been sounded.

The mariner must cautiously approach these Outer Reefs, to describe which to any advantage is almost impossible. Captain Moresby's Charts are the best guide. We shall briefly notice the most prominent reefs and islands.

Okbahn and Kotama, with the shoals off them, have been already described.

Loban is an islet on a reef 10 m. to N. of the latter. Above this islet, the islands stand back to a distance of 15 or 16 m. from the edge of the plateau. The Chart shows no danger between Kotama and Dohrab; sailing vessels might, therefore, in working up against N.W. winds, borrow on this bank towards Sana and Beree Islands, to the E. and E.S.E. of Dohrab, where the water must be smoother than in the open sea.

SHAB FARSEN REEFS.—Dohrab, a low sandy island, in lat. 16° 18½' N., lon. 41° 53' E.,

is the most S. of the Farsan Group. This part of the Outer Reef, from Dohráb to Sail Macowa, 60 m. long, is called **Sháb Farsan**, and on it innumerable shoals are found. Fortunately there are islands placed all along, and within 5 or 6 m. of the outer edge of the plateau of soundings. In the day-time, these are useful land-marks. **Murrak** lies 6 m. to N.W. by N. of Dohráb, and at 2 m. further in same direction is **Dowaslah**. There appears to be no safe channel across the Sháb Farsan between Dowaslah and Sail Macowa. A chain of nameless islets, running N.W. and S.E., lies to the N. of Dowaslah, towards **Zelfeef**, but leaving a deep channel between them and the latter island, the W. end of which bears N.N.W. 18 m. from the former. **Zelfeef** is between the Farsan Islands and Sháb Farsan.

The **W. nameless islet**, in lat. $16^{\circ} 40' N.$, and lon. $41^{\circ} 34' E.$, bearing W.S.W., and 7 m. from **Zelfeef**, is 4 or 5 m. within the line of dangers, and a good land-mark to warn vessels off. A 2-fathoms shoal lies 2 m. to S.W. of it. At 10 m. to the N. of it, lie the **Sarso Islands**, two narrow parallel strips, lying N.N.W. and S.S.E., with an anchorage between them, which shelters from S. winds, indeed from all winds; but, with N. winds, a vessel could not get out, as the S. opening of the channel is blocked up by islets and shoal water. The **W. Sarso** is elevated 160 ft. above the sea. These islands lie on the N.E. verge of Sháb Farsan, with a deep channel 4 m. wide between them and **Jezirat Deesan**, a large roundish island, having elevated ground in its centre, with a high hummock on its S. part, called **Jebel Deesan**.

Dithahaya and **Harneesh**, two low sandy islets, lie 6 m. to the W. of the N. end of **Sarso**. **Sail Macowa**, in lat. $16^{\circ} 58' N.$, lon. $41^{\circ} 21' E.$, lies 5 m. to N.W. by N. of **Dithahaya**, and is the most N. island on the Sháb Farsan. None of these islands should be approached on their W. side nearer than 5 m.; **Sail Macowa** should not be sighted from the deck of a vessel off the N.W. and N. sides of that island, owing to the numerous dangerous shoals.

THE WUSSALIAT ISLANDS are two by themselves, about 6 m. within the margin of the plateau of soundings, now being described as extending from Camaran to Leet. They stand N. and S. of each other. The S. **Wussaliat** is in lat. $17^{\circ} 40' N.$, lon. $40^{\circ} 55' E.$ Two Detached Reefs lie off them at 6 m. to the W., and to the S.W.; the latter one is called **Shab-el-Jurmah**, and is the danger that projects most towards the central highway in this part of the Red Sea.

Caution. Between them and the Sháb Farsan, wherever soundings have been taken, shoals have been found. To the N.N.W. of the **Wussaliat**, there are plenty more to the W. of **Shab Marass**. The surveyors describe this part of the Outer Reef as full of patches.

Zuggak and **Dahrat-Abou-Musali** are two low sandy islets, surrounded by dangerous reefs; the former is in lat. $18^{\circ} 4' N.$, lon. $40^{\circ} 48' E.$ Ships should not sight them from the deck on a N.E. bearing, as numerous isolated reefs encumber the sea for 12 m. to the S.W. of these islets. **El-Hala**, which is a sand-bank or islet, on the verge of the plateau, at 10 m. to N.N.W. of **Zuggak**, is the S.W. islet of four within the area of about $2\frac{1}{2}$ square miles; the others are called **Mugrabee**, **Eloom**, and **Sabeea**. To the N.E. of these islets, a low sand-bank and two reefs were seen from the mast-head, and beyond them nothing but shoals.

Doreesh, in lat. $18^{\circ} 30' N.$, lon. $40^{\circ} 40' E.$, is a low sandy islet with bushes, 18 m. to the N. by W. of **El-Hala**. It stands upon a small coral reef, with no bottom at 40 fathoms around it. **Abou Gulloor Reef** is a narrow breaking reef about 3 m. long, N.W. and S.E.; its N. end is 12 m. to the N.N.W. of **Doreesh**, and from it **Sharbain Islet** bears N.E. about 3 m. **Sharbain** is a small, low, coral island; the sea to the N.E. of it has not been sounded. **Mooska**, a low islet, lies 8 m. to the N., and others beyond. **Shahker**, a small, low, sandy island, with some bushes, lies 26 m. to the N.N.W. $\frac{1}{4}$ W. of **Doreesh**, with a breaking reef, called **Shab Marass**, extending 3 m. to the S.W. of it.

Shab Umbarak, or **Moobarak**, in lat. $19^{\circ} 0' N.$, lon. $40^{\circ} 8' E.$, is a dangerous breaking reef, standing out towards the centre of the sea, further than any others about this part of Outer Reefs. It bears N.W. by W., and is distant 17 m., from **Shahker**. At 10 m. to the E., other reefs commence; and the bank to the N., and the E. of them, though not sounded, is said to be full of dangerous patches with deep water between them, but no navigable channel. At 11 m. to the N. of **Shab Moobarak**, there is a small 1-fathom shoal, with a long breaking reef, lying N.W. and S.E., about 1 league to the N.E. This part of the Outer Reefs is most dangerous, because there are no islands that might be seen from mast-head.

Shab As-sageer, in lat. $19^{\circ} 22' N.$, lon. $40^{\circ} 5' E.$, is a low, rocky, coral islet on a reef, 11 m. to the N. of the 1-fathom shoal. Soundings of 17 and 18 fathoms were found at 9 m. to the W.S.W. from it; but quite close to it, 105 fathoms obtained no bottom. The Chart shows a perfect blank to the E. and S.E. **Jebarah**, a low sandy islet, stands 4 m. to the N. by W. of the last. At 2 m. to the N.W. of **Jebarah**, lies a dangerous reef, **Sháb Muthar**; and at 3 m. further to the N., stands **Dahnac**, a low and sandy island, surrounded by a reef with no bottom close to it

at 130 fathoms. There are reefs to the S.E. and the N.E. of this island. To the N. of Dahnac, there are *Shab Amar*, a half-moon reef, and *Shab-as-Sabah*; the latter reef is 16 m. to the N. by W. of *Shab-as-Sageer*. Several reefs lie to the E. of these; and, further to the E. of this group, the sea appeared from the mast-head to be full of shoals towards Surrein or Serain Island.

Matahtoo, a low sandy island, on which were found a number of graves and a fisherman's hut, is in lat. $19^{\circ} 46' N.$, lon. $39^{\circ} 55' E.$; and stands 10 m. to N.W. by N. of *Shab-as-Sabah*. Three islets stand to the N. and the N.E. **Dohrah**, the outer one, is 3 m. to the N. by E. from Matahtoo. From 4 m. to 7 m. to the N. of Dohrah, there is a cluster of reefs, and to the E. of them there are plenty more, with two long breaking reefs, called *Shab Soolaim* and *Shab Shabac*, the N. extreme of which lies 4 m. to the W. of *Abou Laad* Island.

ABOO LAAD, or **Jebel Ahbulat**, (its N. point) in lat. $19^{\circ} 59' N.$, and lon. $40^{\circ} 7' E.$, is the N. island on the Outer Reefs which we have been describing. It stands 14 m. to the N.E. of Dohrah, and is 12 m. to the S.W. by S. from *Leet* anchorage. *Abou Laad* Island is $2\frac{1}{4}$ m. long, in a N.W. and S.E. direction, $\frac{3}{4}$ m. broad; 250 to 300 ft. high, and surrounded by a sandy plain. It is quite barren, and destitute of water: branches of coral are observable sticking out of its highest parts. There is a small port for fishing-boats on the W. side; and beyond it, breaking reefs in that direction, and to the S.E., as far as can be seen from the top of the island. There are also several rocky patches near the edge of the Outer Reef to the N. of the island, about 3 m.; others to N. by W. One rocky patch, at 6 m. to N.W., is on the N. margin of the plateau, and only separated from *Shab-el-Jeffeen* (on the coast to the W. of *Leet*) by a channel, 5 or 6 m. broad. This channel, too, has reefs in its centre, and it is better to keep nearer to the coast-reefs. (See *Leet* at page 175.)

PASSAGE ALONG ARABIAN COAST FROM CAMARAN TO LOHEIA.

The Coast. From *Ras-el-Bayath* round *Ras Essah*, the shore is bordered by a reef, steep-to; and nearly 4 m. S. by W. from the former is a low island or sand-bank, called *Rasher*, surrounded with a reef, and with 14 fathoms between it and the main. From *Ras-el-Bayath* the coast bends to the E., and round to the N., forming a bay called *Camaran*, the N. point of which, *Jebel Maharseen*, is a piece of high land, having below it a mosque; thence to N.N.E. to a sharp point of land named *Ras Arafar*, or *Ahrifah*. At 20 m. to N. of *Ras Arafar* stands the town of *Loheia*. The coast forms a bay to the S.E. of the former, and from thence an irregular shore up to the latter, fronted all the way with a reef; which, at 5 m. to S. of *Loheia*, extends $2\frac{1}{4}$ m. from shore.

Camaran Island. The S.E. point of this Island, in lat. $15^{\circ} 16' N.$, lon. $42^{\circ} 33' E.$, lies nearly $1\frac{1}{4}$ m. to N.W. of *Ras-el-Bayath*; its E. side extends from thence in a N. by E. direction above 11 m., and the Island is from 2 to 4 m. broad; composed of hard rock intermixed with sand, and in some parts earth capable of cultivation; there are some spots on which date trees flourish. The Island is generally low, but towards the S. there are some elevated parts forming small hills; on the N. it is swamp and jungle. Including *Camaran*, there are seven small villages upon this Island, mostly consisting of a few miserable huts belonging to fishermen employed in its neighbourhood on the pearl banks, turtle islands, &c. Excepting a small portion of its E. side, the Island is bordered by a reef, which, off its S.E. point, extends little more than 1 m. towards *Ras-el-Bayath*, whereby the entrance to *Camaran* Bay is reduced to a breadth of 700 yards.

Channel and Anchorage. There are 4 to 6 fathoms on the edge of the island reef, and in the channel 8 to 11 fathoms, mud, the greatest depth being towards the *Ras*. In approaching this entrance from the S., pass inside the little Island *Rasher*, keeping in about 15 fathoms along by the coast reef; keep a look-out for the sandy point of *Bayath*, and haul round it as requisite for the entrance. There is good anchorage in the small bay or harbour of *Camaran*, half-way along the E. face of the Island, in 7 fathoms mud, with the fort bearing S.W., distant about 2 cables; and the town W. by S. Large vessels had better anchor outside in the extensive and remarkable fine bay formed by the island and adjacent coast before-mentioned, where are regular soundings and moderate depths: here wood and water may be procured on the island.

The W. side of Camaran. There is anchorage off the W. side of the Island in 4 fathoms, opposite *Muckram* village, known by a few date trees and a small white mosque to the S. of it. The *Muckram* Reef extends 1 m. off this part, with a small sandy island on it, 1 m. to N.W. of the village. At 3 m. to N.W. of *Muckram*, is a small sandy island with a reef $\frac{1}{4}$ m. off its W. side, but a little way only off the E. end; and it has a channel on each side. At 4 m. to the W. of *Muckram*, is a dangerous shoal lying in a N.N.W. and S.S.E. direction, in length 4 m., with 2 and $2\frac{1}{4}$ fathoms near its centre, and 4, 5, and 6 on each end, rocks and sand. There are 30 and 35 fathoms close to the S. end of this shoal, 32 at its N. end, and 35 fathoms just within it. Without the above-

mentioned shoal, at the distance of 9 m. to the W. of Muckram village, is a 4-fathoms shoal of rocks and sand; it is about 3 m. long, N. and S., and has 30 fathoms near it on all sides. The discoloured water on these shoals may generally be seen.

Channel. There is a good channel between Camaran Island and the inner shoal to the W. of it, where the breadth is about 3 m.; and between Camaran Reef and the small island 3 m. to the N.W. of Muckram, $1\frac{1}{4}$ m. wide. When running up from the S., the depths are 6 and 10 fathoms near the island reef, and 19 in mid-channel; from thence a decrease towards the S. end of the inner shoal. But, when proceeding to sea from the anchorage off Muckram, the depths increase gradually to the N. end of the shoal, where there are 35 fathoms. In the channel between Muckram and the island to the N.W. of it, the depths are irregular, 12 and 7 fathoms in mid-channel, and 5 on either side of it; and afterwards 16 and 17 fathoms between Camaran and El Bother. Between the inner and the outer shoal, there is a gut of deep water, there being 35 and 40 fathoms near the W. side of the inner shoal, and 22 on the E. side of the outer one, between their S. points; and between their N. points, 39 fathoms near the inner and 28 near the outer. Should a vessel get between these, a course about N. by W., for the bluff on the S. part of Okbahn Island will carry her through.

El Bother, about 3 m. to the N.W. of Camaran, is a low sandy island about 3 m. in length E. and W., surrounded by a reef, which extends off the S. side $1\frac{1}{4}$ m., with 5 or 6 fathoms on its edge, rocks and sand. There is a good channel on either side of this Island; that between it and Camaran is 2 and 3 m. wide, with from 10 to 23 fathoms, being bounded on the S. by Camaran and the small island to the N.W. of Muckram, and on the N. by the reef off the S. side of El Bother. At 3 m. to N.W. of El Bother, is a patch of 7 fathoms; and at $1\frac{1}{4}$ m. to N.E. of its E. end, is a patch of 1 fathom.

About 4 m. to W. of El Bother, is the S. end of **Okbahn Island**, which extends thence in a N.W. direction about $4\frac{1}{4}$ m. It is low and sandy in the centre, with a hill on its N.W. end, and a bluff on the S. There are deep soundings on the E. and S. sides, and a reef runs along the W. side about $\frac{1}{2}$ m. off the Island, and continues round the N. end, where it extends $2\frac{1}{4}$ m. off, and is steep-to, having 23 fathoms near to its W. edge, and 8 and 15 fathoms on the edge of the reef at the N. end, decreasing towards the Island.

Channel. There is a good channel to the S. of Okbahn and El Bother into Camaran Bay, and there is also a channel between it and El Bother to Loheia. Any of these channels may be used by keeping a look-out for the patches, which may be seen excepting in hazy, thick weather.

Cadmon Segeer and Cadmon Kebeer are two low sandy islands to the E.N.E. of Okbahn and N. of El Bother. A reef extends from Cadmon Kebeer nearly $1\frac{1}{4}$ m. to W.S.W. with 5 fathoms on its end, and there is also a 3-fathoms patch about 2 m. W. of the Island. At 3 m. to N.W. of Cadmon Segeer, lies another shoal about $2\frac{1}{4}$ m. in length, in a N.N.W. direction, having 3 fathoms rocks and sand on it, and 24 fathoms near both sides.

Humreek Island, 5 m. to the S.W. of Loheia, is about 2 m. E. and W., and $1\frac{1}{4}$ m. wide. This Island is low and sandy, with a fishing village on it, but no water, that article being supplied from Loheia. In the centre of the N.E. and W. sides are two small white mosques, one of which is used as a mark for the anchorage at Loheia. Between the E. point of the Island and the extensive reef off the coast, the inner channel is not $\frac{3}{4}$ m. broad.

Two small shoals, called *Shab-el-Bunjam* lie 4 and 5 m. S. by E. of Humreek Island; and at 5 m. to S.E. of them is another small shoal. They lie from 2 to 3 m. off the coast, and may be seen by a good look-out and passed on either side, though it will be as well to pass to the W. of them in going from Camaran Bay through the inner channel to Loheia, or the contrary.

Islands near Loheia. At $3\frac{1}{4}$ m., N.W. by N. from Humreek, and about 7 m. W. of Loheia, is the Island **Bowahrid**, and to the W. of it four others, forming the N. side of a channel from Loheia to seaward, and the contrary. These islands are *Gooban*, *Goosee*, *Entookfash*, and *Kotama*. *Bowahrid*, *Gooban*, and *Goosee*, are low and small, with channels between them; that between *Gooban* and *Goosee* is very narrow, and has from 3 to 4 fathoms; between *Bowahrid* and *Gooban* is a channel of 6 and 7 fathoms. **Entookfash** lies E. and W. 6 m. in length, and is a low, sandy plain, with a hill upon its W. end, from which a reef extends 3 m. to N.N.W., with 8 fathoms on its extremity. Antelopes are plentiful, but there is no fresh water on the Island; there are two or three huts, occupied by fishermen, who are employed procuring turtle. Between this Island and the small Islands *Gooban* and *Goosee*, off its E. end, there is good anchorage in 4 or 5 fathoms. The reef on the S. side of *Entookfash* extends more than 1 m. off shore, and there is also a bank with from 2 to 12 fathoms on it, and black rocks above water, from 2 to 3 m. S. of the hill, and a channel between them and the island reef, and from it an outlet to the N. of *Kotama* and reef.

Kotama Island, in lat. $15^{\circ} 41' N.$, lon. $42^{\circ} 16' E.$, is described at page 167.

Hamar Island, about 4 m. to N.W. of Loheia, and 3 m. to the N.E. of Bowahrid, may be passed on any side at a little more than 1 m. off. (See also page 176.)

LOHEIA TOWN is built of coral, and has some large houses; it is surrounded by a wall, with several forts and towers adjacent. The principal is a fort on a hill which commands the town and neighbourhood, but it is in a ruined state. There is an excellent bazaar in the town, generally well supplied with cattle and poultry, excepting during the Ramazán, when the market is not so well attended; flour, onions, and sweet potatoes may be had here, but neither rice nor biscuit. The water is good, but distant from the town, from whence it is brought in jars on camels. Loheia is in lat. $15^{\circ} 42' N.$, and lon. $42^{\circ} 39' E.$

The **Anchorage** off this place is in a gut in the coast reef, which runs up to the town in a N.E. direction, where small boats anchor. The entrance bears E. by N. from the white house or mosque on Humreek Island. You run in with the first high tower a little to the N. of Loheia Fort, on with the Northernmost of two small mounds bearing in one about N.E. by N. A ship cannot go far inside the entrance, and would then be nearly 3 m. from the town; it has also some dangerous patches, and therefore cannot be recommended for general use.

Approaching Loheia from the S., through the Channel close to the W. side of Camaran. Having passed Rasher in 24 fathoms, or about 3 m. to the W. of it, steer about N., keeping about 1 m. from Camaran; and after passing that part of the island reef off Muckram village (the outer part of which bears nearly S. of the small island 3 m. to the N.W. of it), steer to the N.E., between that Island and Camaran Reef, where will be found 12 and 7 fathoms in mid-channel. Having passed the said small sandy island, the depths will increase to 16 and 17 fathoms in mid-channel between El Bother and Camaran Island; then, if going round the N. end of Camaran, go no nearer than 14 fathoms, as 10 fathoms are near the reef which extends from it about 1 m.; but if going to Loheia, beware of a 1-fathom patch, about $1\frac{1}{2}$ m. to the N. of the E. end of El Bother, and steer direct for the narrow channel at the E. end of Humreek Island. Give that E. end a berth of $\frac{1}{2}$ m., then haul up to N., to avoid the shore-reef, until the above marks for Loheia anchorage are on.

THE COASTS OF YEMBO AND HEDJAZ, FROM LOHEIA TO LEET.

From Loheia the coast turns N.N.E. about 9 m., forming a slight bay between; then to the N. 8 leagues to **Ras Musahrib**, in lat. $16^{\circ} 14' N.$, and lon. $42^{\circ} 43' E.$, forming a slight curve inward; the whole space being bordered by a reef less than a mile in breadth, excepting in the vicinity of the Ras, where a shoal patch extends 2 m. off. From Musahrib the coast bends about N. by W., a distance of 40 m., forming a bight with sinuosities to **Ras Shamah**, a projecting point, in lat. $16^{\circ} 52' N.$, lon. $42^{\circ} 29' E.$, 3 m. S.E. of which is **Gurnah Shurnah**, a bushy point, the reef bordering the shore all the way to the latter place, about $\frac{1}{2}$ m. wide. The coast nearly the whole space from Loheia is covered with jungle, without village, hut, or inhabitant.

Gheesan Town is to the N. of Ras Shamah, and has a few square stone buildings, but the principal of it consists of grass huts, which are mostly round, with pyramidal tops. It has a large fort, greatly decayed, and there is a small bazaar, scantily supplied with such dry provisions as the natives use, but none for ships. Water is very scarce. The population of Gheesan is about 400, employed chiefly in the pearl-fishery, &c., on the banks in its neighbourhood. The anchorage is in 7 fathoms about 2 m. off shore, with the fort bearing E. by N. There is a sunken sandy patch of 2 fathoms in the line of 6 fathoms soundings $1\frac{1}{2}$ m. to the S.W. of the rocky point of the land, that is, about $\frac{1}{2}$ m. S. of the town. The fort bears about N.E. $\frac{1}{4}$ N from this patch, distant about $1\frac{1}{2}$ m., and a small white mosque in the town is in line with a remarkable rock on a hill behind it. The shore-reef projects considerably at Gheesan, and the soundings are irregular inside the depth of 7 and 6 fathoms; but there is a place in 3 $\frac{1}{2}$ and 4 fathoms about a mile off shore, at a short distance from a rocky spot, forming an inner anchorage for small boats off the town. The *Palinurus* anchored in 4 $\frac{1}{2}$ fathoms, sand, off the town, the fort bearing E. by N., and Ras Shamah S.S.E. $\frac{1}{4}$ E. Gheesan Hills cannot be mistaken; they are close behind the town, and have no other high land near them. **Gheesan** lies 12 m. to S.E. of **Ras Toorfah**, and may easily be approached from the N.W., past the islands of Theran and Shoorah. (See top of page 176.)

The **Coast** goes to N. from Gheesan for 9 m. to Karn-el-Watah Bay. At 8 m. N.W. from Ras Shamah is the E. end of **Ferafer Island**, which is $2\frac{1}{2}$ m. in length W.N.W., narrow, low, and sandy. **Khor Abou-Sabah** is a bight or arm of the sea, about 14 m. deep, running into the coast N. of Ferafer Island: the inner and E. part of it is shallow, but in the S. and W. part is good anchorage of 6 and 7 fathoms, formed by a narrow neck of land, the S. part of which is called **Ras Toorfah**. This Ras, or Cape, extends within 1 m., or little more, of the W. end of Ferafer Island, having a good channel of 8 and 10 fathoms between, leading in to Khor Abou Sabah.

Ras Toorfah is in lat. $16^{\circ} 59' N.$, and lon. $42^{\circ} 19' E.$ Shoorah Island lies 8 m. to W. by N. of this cape. (See also page 178.) The coast from thence runs nearly N. for 27 m. to Shab Abou Looka, where it forms a small bight, 7 m. S. of which is Shab-el-Kebeer. Here the coast-reefs extend nearly 2 m. from shore, decreasing in breadth both to the N. and S., but from Ras Toorfa 15 m. to N. there is no coast-reef.

Khor-el-Etwid, which runs a short distance into the coast, and has $2\frac{1}{2}$ and 2 fathoms on it, bears N.W. 9 m. from Shab Abou Looka. There is a long shoal off the entrance, with 3 fathoms inside, and there is a $1\frac{1}{2}$ -fathom patch of rocks 2 m. W. by N. of the entrance, and 1 m. off the coast, with 5 fathoms just outside it. The village of Etwid is 5 or 6 m. inland. Jebel Etwid, a very remarkable peak on this part of the coast, is to the N.E. of Khor-el-Etwid, and will easily be known, as it appears quite unconnected with the range of hills in the neighbourhood, and is much nearer to the coast. At 8 m. N.W. from El Etwid is **Gecass** (Kiyás), off which is a long reef whose N. end is abreast of Shukaik, and about $1\frac{1}{2}$ m. from the coast, with 2 and 3 fathoms within it; and nearly 4 m. W. of this place is a patch of rocks with $4\frac{1}{2}$ fathoms on it. About 9 m. further is **El Mahjis**, a Bedouin village, well peopled, off which the coast-reef projects nearly $\frac{1}{2}$ m., forming the little **Khor-el-Mukrah** to the N.

Widan is 12 m. N.W. of El Mahjis. At this place a narrow neck of land projects from the coast, forming a semicircular bay, $\frac{1}{2}$ m. broad, affording good protection from S. winds only; the depths within are 3 and 4 fathoms: seen from the W., this point of land has the appearance of an island. There are no buildings nor fresh water, but cattle are plentiful. There is a high hill close to the sea, on the N. part of Widan anchorage, called Jebel Bugrah. Jebel Rukbut Kadair is a high hill forming a cape to the S. of Widan anchorage. Jebel Widan lies E. of Jebel Bugrah; the centre, or highest part, forms a small peak.

From Ras Toorfa to Widan, there is anchorage all along the coast. W N.W. 5 m. from Widan is **Kotumbal Island**, situated about 2 m. from the main. It is about $\frac{1}{2}$ m. in length, and forms a rugged peak, like a quoin, 400 ft. high, with a steep ascent on its N. side, the only part accessible. The top of it is only a few yards in length, and very narrow, forming a perpendicular declivity to the S. and W.: on the E. it forms a deep slope. The character of the rocks on the island is volcanic. There are 12 fathoms between Kotumbal and the main. About 3 m. S. by E. from Kotumbal, and $3\frac{1}{2}$ m. W. from Widan, is a rocky patch, with 30 fathoms to the N. of it.

Kassar or **Cussar** is a Bedouin village 7 m. N.W. from Widan Point, and 3 m. N. of Kotumbal: with the ruins of a brick-built fort; but no supplies can be procured. At 4 and 7 m. N.W. from Cussar, lie the S. and N. roadsteads of **El Wussim**, both affording good anchorage and protection; but it would be difficult to get out from the former in S. winds. The latter has a bar of sand across the entrance, which connects the shore-reef to the shoal on the N. part of the entrance. The least water found on the bar is $2\frac{1}{2}$ fathoms; within it there are 6 and 7 fathoms, mud. The remarkable hummocks between these anchorages will direct to either of them: these are three steep and lofty hills, in one, when bearing E., the anchorage lying to the S. and N. of them. The outer or W. hill is called Wussim.

N. by W., distant 5 m. from N. El Wussim, and close to the shore, is **Abou Lelf Island**, or **Abou-l-Mahlef**; and 3 m. N.W. from it, another island, called **Assore**, or **Haar**, about a mile from the coast: the former a small quoin, separated from the shore by a narrow shallow channel; the latter, a low wooded island, and both surrounded with reefs forming good anchorages. The reef extends W. 2 m. from Abou Lelf, from whence it bends to the S.E., forming an inlet $1\frac{1}{2}$ m. deep, running up to N.N.W. opposite Dahban, in which it is not advisable to anchor with S. winds. The reefs above Assore Island, and to the N. of it, extend about 3 m. from the coast, and form inlets to the S. and N. of that island, with good anchorages, which will be better understood by looking at the chart than by any description that can be given. The same may be said of El Burk, about 4 m. to the N. of Assore Island. This Khor, or inlet, runs into the land to the N., and the W. side of the entrance is partly formed by the coast-reef, extending S. from a projecting part of the coast. Here a vessel may find good shelter from all winds. In the entrance is a shoal patch, the least water found on which is 4 fathoms; within are 5 fathoms, mud. There are some wells of good water near the shore, where are some date-trees; and there are the remains of a strong-built wall of unhewn stone, but no houses. The Shifting Peak, bearing E., leads to the entrance of this Khor.

Nahood is a good Khor, 3 m. to the N. of El Burk; at its entrance Jebel Tusi Sharm bears about N.E. In the neighbourhood of Mersa Nahood and El Burk, the range of hills converges towards the coast, the tops resembling the roof of a barn. Amongst these, there are two larger than the rest, called by the natives Jebel Tusi Sharm and Jebel Tusi Yemnee, or the Woman's Breasts. From El Burk they appear in the N. part of the range of hills, and then will be better known by having to the S. a detached piece of land, showing more like a barn than either of them.

Shifting Peak is in the second highest range of mountains to the W. of Nahood Hills, and is very conspicuous when seen from the N.

Opposite Nahood the inner channel is $1\frac{1}{2}$ m. wide between the coast-reef and a bank which extends E. from *Jezirat Mogid*, an island, lying 8 m. to W.S.W. of Nahood. About 11 m. further N. is *Ernege*, or *Khor Ermek*, a small inlet in the coast-reef, with 6 or 8 fathoms, water. Here are no houses nor huts to be seen, nor can fresh water be procured.

Between Nahood and Ermek is a bank lying parallel to the coast, called *Ohm Kergan*, forming the W. side of the Inner Channel, which is little more than a mile wide. The N. end of this rocky bank is 3 m. S. of Ermek; it thence extends 6 m. S., and is $1\frac{1}{2}$ to 2 m. wide. Its N. part is rocky, shallow, and uneven; on the S. part the water is somewhat deeper. Within this bank there is no coast-reef, and the mid-channel depth is about 20 fathoms; but there are two shallow patches at the N. end of it. Four m. to the N. of Ermek, is *Jafoof*, the coast between forming a point, from which a reef extends S. 2 m., with 2 fathoms on it, within which are 9 to 6 fathoms in Ermek anchorage. Between this reef and Ohm Kergan is a patch with $2\frac{1}{2}$ fathoms on it. From the last-mentioned point of land to Hali Point it is $7\frac{1}{2}$ m. N.W., the coast between forming a bay, with good anchorage in 5, 7, and 8 fathoms, well sheltered from N. and E. winds, but the coast is bordered with a reef. The Point of Hali is bordered with an extensive reef, and some patches: the anchorage off this point, in 6 or 7 fathoms, is rather exposed. There are no houses to be seen, but a town or village is said to be not far inland. N.W. by N., 8 m. from Hali Point, is a projecting point of land, called *Ras Abou Kelb*; the reef, about midway between, extending 2 m. from shore, with 4 fathoms close to it. Five m. to the N. of the point is *Serome*, and 4 m. further is *Undareh*, off which *Jebel Hali* bears E. $\frac{1}{2}$ S. *Serome* has a small anchorage for boats. The anchorage at *Undareh* is formed by a shoal of the same name, the S. part of which has patches that are dangerous. The safest channel, in or out, is to the N. of the reef. If going out through the S. entrance, run 3 or 4 m. to the S. of the anchorage before hauling to the W. The depth at the anchorage is about 7 fathoms. Upwards of 3 m. to N.W., is *Ras Abou Mutnah*.

Makasir is about 4 m. N. by W. from *Ras Abou Mutnah*, and nearly 11 m. S. by E. of *Coomfidah*. This place has good protection from S. winds, but there are some small patches in the entrance to the anchorage. The place will be known by the *Moolgamari Islands*, which are 3 m. to the W.N.W., and have anchorage all round them. At 6 m. N.N.W. of them is *Ohm-us-Saifa Island*; all are low sandy islands, covered with bushes, and there are some rocky patches in their neighbourhood, easy to be discerned. The best channel is between the islands and the main: or you may pass between the islands, avoiding the rocky shoals S. of them, and a rocky patch off the N. one.

COOMFIDAH is a small town, in lat. $19^{\circ} 7' N.$, lon. $41^{\circ} 5' E.$, surrounded by a wall, and is under the Turkish government: it has two forts towards the sea; and to the S., without the walls, is a mosque, with a minaret. It has a small bazaar, which affords sufficient for the consumption of the place: but by waiting a few days, supplies of cattle may be obtained from the interior. The best water on the coast is to be had here, and as quickly as the ships' boats can carry it off: it is brought down in mussucks, on camels, alongside the boats, and the casks filled. In July and Aug., good grapes are also to be had. The anchorage is formed by a low bushy island, off the port, which is surrounded by a reef, easy to be seen, and may be approached close in luffing up to fetch the anchorage. There is a small shoal to the N. of the island, and the best channel is between it and the island reef, where there are 7 and 8 fathoms. There is a narrow channel, of 5 or 6 fathoms, to the E. of the island, used by boats: it is formed by the island reef and a rocky spit off the town. There is also a shallow channel of about 2 fathoms to the N. of the small shoal in the entrance, but it is rocky, and not to be recommended. There is good, well-sheltered anchorage in $2\frac{1}{2}$ fathoms, mud, with the N. fort bearing E.N.E., and the S. fort E.S.E. The remarkable mountain *Kaus Abou-l-Aya* bears E. $\frac{1}{2}$ N. from this anchorage.

Mountains.—*Jebel Hali* Mountain is to the S.E. of *Coomfidah*, in the nearest range of hills: it is a very remarkable pyramidal piece of land, when seen from that place and to the N. of it; but in proceeding S. it quickly alters, and at *Undareh* it appears an oblong hill, with its N. part rounded off abruptly.

Jebel Dogar is a most remarkable piece of land, on the highest range of mountains to the N. of *Coomfidah*: on the S. side it runs off to a peak; but its N. extremity forms more like a quoin, the thickest part of which is to the N. *Jebel Shahga*, or *South Peak*, is a remarkable piece of land, on the second range to the N.W. of *Jebel Dogar*. *Kaus Abou-l-Aya*, or *Gose Aboule Ire*, is in the highest range of mountains to the E. of *Coomfidah*; its N. brow forms a high mound until well to the S., where it becomes rugged: its S. brow has a small but conspicuous peak. This mountain may be seen to the N. of *Ras-el-Askar*.

The coast of the Hedjaz from Coomfidah to Leet, has a comparatively smooth and good navigation, but it is well to take a pilot. From Coomfidah the coast runs N. and N.N.W. to **Ras Mutweer**, a distance of 13 m., having several rocky patches and low islands between, at 1 to 2 m. from the coast. At 9 to 12 m. from Coomfidah are some patches in mid-channel, and to the W. of it. S.W. about 1½ m. from Ras Mutweer is the N. end of a reef which extends 2½ m. S.S.E., having two small islands upon it; and the coast-reef runs off W. 2 m. from the Ras, forming a point with 6 fathoms at its extremity; whence it runs N., and joins the coast. Between this and the reef last mentioned is a channel, a mile wide, with 5 and 6 fathoms on it; the channel to the W. of the reef, between it and the Farrar Islands, is 4 m. wide, with 12 fathoms on it, and at Coomfidah it is 8 m. wide, with 18 to 20 fathoms.

The **Farrar Islands** have their S. end in lat. 19° 17' N., distant 5½ m. from the coast; they thence extend 18 m. in a N.N.W. direction, all low sandy islands, with a few bushes. They are situated on the E. edge of the Outer Reefs, and forming the W. boundary of the Inner Channel. To the S. of these Islands the edge of the reef is marked by rocks and rocky patches, with 18 to 20 fathoms close to it. The **Cuffeel Islands** are next to the Farrars, and are of a similar description, and similarly situated on the inner edge of the bank; they form a segment of a circle from W.N.W. to N. by W., for 9 m. From Ras Mutweer to **Ras Mahasin** it is 21 m. N.W. by N.; this is a long point, or tongue of land, running out to N.W., and is 5 m. N.E. from the N. extreme of the Cuffeel Islands. The coast between these places runs N. and N.W. from Ras Mutweer about 11 m. to **Dogar**. At this place there is good anchorage in 5 fathoms to the E. of a small patch which forms the roadstead. Here are a few huts, and the inhabitants are civil, but no fresh water to be obtained. Two reefs lie to the W. and S. of Dogar, extending about 5 m. S.S.E., with some small islands on them; they are from 1 to 2 m. off shore, and there are 6 and 7 fathoms between them and the coast reef. Some patches lie N.N.W. of them; and from these, others extend to W., with 6 to 8 fathoms between them to near mid-channel, where there are two small islands, with 12 fathoms close to the S.W. of them; these are about 2 m. S.W. of Ras Zoogabi. There is a reef to the N. of these islands. N. by W. 2½ m. from them, and S. by E. 2½ m. from Ras Mahasin, is a small island, with a reef running W. 1 m. from it.

The **Channel** is to the W. of all these islands and reefs, but to the E. of the Farrar, Cuffeel, and Serain Islands. It is nearly 4 m. wide, and has from 12 to 9 and 17 fathoms in it.

The **Coast**. The distance is 7 m. from Ras Mahasin to **Ras-el-Humar**, a tongue of land running S., and with the former forming a bight or bay in the coast, bordered throughout with a reef. In the mouth of this bay is an island, about 3 m. long N. and S.; and reefs and patches, with channels between them, extending from its N. end to the N. point of the bay. There are also reefs and patches on the E. side of the island in the bay; and off its S. end and W. side there are numerous reefs and rocky patches, with deep-water channels between, extending across the channel to Serain Island, a distance of 5 m. On a clear day, all these reefs may be discerned from aloft, by a difference in colour of the water.

SURREIN, or SERAIN ISLAND, is high, with irregular top, about 7 m. long and 1 broad; it is surrounded by a broad reef, and some patches on the S.E. part, which form the inner boundary of the outer reefs. It consists of madrepores and sand, and is not inhabited, there being neither water nor wood. There are some patches to the S.E. of it on the edge of the reef, which here bends to the S., and joins the Cuffeel Islands. There are 19 fathoms close to the N.E. of Serain, and to S.E. of it is a patch close to the reef; the best channel is between this last and another to the N.E. of it about a mile. From the E. end of Serain, the edge of the reef, studded with patches and rocks, runs N.N.W. about 10 m. to the S.E. end of **Jenarbet Island**, about 2 m. in length, very narrow, and surrounded by a reef; a similar island, about half its length, lies to the N.E. of it, also surrounded by a reef; both are low and bushy. N.W. by N. 8 m. from Ras-el-Humar, is **Ras-el-Askar**, and 5½ m. farther on the same bearing is **Gillargin (Jilarjin)**, the coast being bordered with a coral reef throughout the whole extent. About W.N.W. 2 m. from Ras-el-Humar, and about mid-channel is a small island, surrounded with a shoal, with 15 fathoms on its S.W. side, and a patch about a mile to the W. of it. About ¾ and 1½ m. N. by W. from this small island are two others, of a similar description; and between the N. one and the small island N.E. of Jenarbet is a small island, also surrounded with a reef, having a channel between, with 15 fathoms on it. Off the N.E. side of the small island E. of Jenarbet are two small islands, with reefs round them.

Channels. The Outer Reef hereabout approaches nearer to the coast than it does farther S. An extensive reef between forms two channels; that nearest the coast, the narrowest, being in one part, opposite Ras-el-Askar, only 400 yards broad, with a depth of 5 fathoms. **Ras-el-Askar** may be known by having trees on its points, there being no others on the shore near it. This Inner Channel is considered the safest, as the shoals can be much better seen than in the outer one,

although the outer one is almost always used when the wind is to the W., as by going through the inner one, they would, in all probability, have to tack to clear the coast, and regain the centre of the channel. In going through either of these channels, it requires a good look-out. When coming from the S., the extensive reef in patches that separates the channels will be seen, and the sand-bank on the S. part of it; these will be a good guide to judge your distance from the patches forming the W. side of the Outer Channel, on which the least water found was 3 fathoms. If going through the Inner Channel, pass in between the sand-bank just mentioned and an island S.E. of it, taking care to avoid a shoal of 2 fathoms in this channel about half a mile off the island, with 18 fathoms close to it. Or you may pass inside the island, keeping a good look-out for the patches off them, where the least water found was 3 fathoms. The clusters of patches forming the two channels of Ras-el-Askar have deep water between, and on many of them there are 2, 3, and 4 fathoms.

Jilargin, or Gillargin has good anchorage in 10, 9, or 8 fathoms mud. Going in from the N.W., after passing Shab Multhar, steer for the point of the reef off the entrance, and leave all the sunken patches that are visible on the left hand in passing them. At this place there is neither house nor hut.

Rahker lies N.W. by N. about $8\frac{1}{2}$ m. from the point of Jilargin, the coast between forming a bight, bordered with a coral reef, in which are several patches of 3 and 4 fathoms, with 20 and 24 between them. Rahker will be known by the high sand-hills close to the beach to the E.: it has good anchorage formed in a bight of the coast-reef, in 4 fathoms, mud, well protected. The reef here extends nearly 2 m. from the coast, and there are some rocky patches off the entrance, and also an extensive shoal in patches from S. by E. to S.W. of it, called **Shab Multhar**, nearly a mile off the coast-reef; and there are other patches to S. and to S.E. of it. Leet town lies 13 m. to the N.W. from Rahker, and for more than half the distance the coast-reef extends more than 2 m. off, after which its breadth decreases to about $\frac{1}{2}$ m., with some patches off it, and 6 to 10 fathoms at a short distance from it. The anchorages of Leet are formed and sheltered by patches, the largest of which is full 3 m. to the S.W. A vessel going to Rahker, and being just outside this patch, should first steer out about S.E. by S. for 7 m., taking care not to get into less than 14 fathoms, to avoid the extensive patches off the shore-reef; and when to the S. of these, an E. by S. course for 5 or 6 m. will carry her to the entrance of Rahker; but the soundings are very irregular, from 12 to 5 fathoms, rocks.

LEET HARBOUR. The inner anchorage (nearly 1 m. to the E. of Aga Island) is small, but well protected by two reefs off it, between which is the best entrance: the depths are from 4 to 6 fathoms mud. In leaving this place, if going to the S. of the E. patch, it will be necessary to luff close round its point to the S.W., to avoid many dangerous patches off the shore-reef. The best anchorage in the outer road is about $\frac{1}{2}$ m. to the S. of Aga Island, where there are 10, 12, and 14 fathoms water, mud. About $1\frac{1}{2}$ m. to the S.W. of Leet is an extensive reef of innumerable patches, with a channel on each side of it; the W. end of this reef bears S. by W., distant $1\frac{1}{2}$ m. from Aga Island. **Aga Island** is to the W. of Leet anchorage, and is a small sandy island, in lat. $20^{\circ} 9' N.$, lon. $40^{\circ} 11' E.$ The town of Leet consists chiefly of huts, with a few mud buildings, and is situated to the S.E. of the inner anchorage, about 1 m. from the beach. Fresh water can be procured at that distance, but other supplies are very scarce.

The N. extreme of the outer reef plateau (before described at page 168) lies to the S. and the W. by S. of Leet; where there is a rocky patch 10 m. S.W. by W. from Aga Island. All along this space there are many rocky patches, and deep water on the edge of the reef, but no passage through to seaward. About 3 m. within the edge of the reef is **Abou Laad Island**, in lat. $19^{\circ} 58' N.$, nearly 12 m. S.W. by S. from Leet anchorage. (See page 169.)

Navigation of the Inner Channel, from Camaran Island to Leet. The Inner Channel, from Camaran to Leet, is marked on the W. side by numerous islands, rocks, and rocky patches, profusely scattered on and about the inner edge of the Outer Reef; and bounded on the E. side by the coast, which is bordered by a reef nearly throughout the whole extent, in which are several breaks, and some of them form secure anchorages. The S. end commences at Camaran, where it is only 700 yards wide between Camaran Reef and Ras-el-Bayath, and the channel is nearest to the latter; from thence its breadth increases to about 2 m., until at the narrow part between Humreek Island and the Coast-Reef S. of Lobeia. The patches at 4 to 6 m. S. of Humreek may be passed on either side. The channel from Lobeia increases in breadth to 2 m. or more until opposite **Ras Musahrib**, where it is rather less than 2 m.: the soundings are moderate, and will be best understood by looking at the chart. Passing Ras Musahrib, it increases in breadth to 4 m. between **Toag Island** and the coast; and also within **Ashig Island Reef**, beyond the N. end of which it is 10 m. wide, and so continues until between **Dahret Jafree** and the Coast-Reef, where the breadth is reduced to less than 5 m., and farther on to less than 4 m., between **Ohm-el-Garib (Karib)** and the Coast-Reef off Gheesan, and so continues as far as Ras Toorfah.

Between **Shoorah** and the main the breadth of the channel is little more than 2 m.; but after passing **Theran**, where its breadth is 7 m., it increases to 10 and 12 m., till abreast of **Aboo Lelf Island** it is again contracted to 4 m., between the S. end of the reef extending from **Jezirat Mogid Island** and a projecting reef from the shore; and 9 m. farther it is only $1\frac{1}{4}$ m. wide, between the N. end of that reef and the reef off **Nahood**. Farther on, between the bank called **Ohm Kergan** and the Coast-Reef between **Nahood** and **Ernege**, the channel is little more than 1 m. wide. The patch off the N. end of that bank may be passed on either side, and a course steered to pass at $1\frac{1}{4}$ or 2 m. to the W. of **Háli Point** and **Ras Aboo Kelb**. Hereabout are some reefs nearly in mid-channel, which may be passed on either side, as most convenient, always observing to keep a good look-out. If it be deemed advisable to pass to the E. of these reefs, it will be best to sail through **Undáreh Roads**, as good anchorage will be found there, if necessary. Having passed **Undáreh** and **Ras Abboo Mutnah**, the best channel to N. is between the **Moolgamari** and **Uhm-us-Saifa Islands** and the main to abreast of **Coomfidah**; or, if more convenient to pass between these islands, care must be taken to avoid the rocky shoals in their vicinity. At **Coomfidah** the channel is 8 m. broad, with 18 and 20 fathoms water. A course may be steered abreast of **Coomfidah**, about N.W. $\frac{3}{4}$ N. towards the S. end of the **Farrar Islands**, observing that the inner edge of the Outer Reef to the S. of the islands is marked by rocks and rocky patches, with deep water close-to. By passing near this edge, the patches lying about 3 m. to the S.E. of the islands will be avoided. The **Farrar** and **Cuffeel Islands** mark the W. edge of the channel, and may be passed at a moderate distance; and, should it be necessary, good anchorage may be found at **Dogar**. Having passed the **Cuffeel Islands**, reefs and rocky patches continue to mark the edge of the Outer Reef to abreast of **Serain Island**, off the E. end of which are two patches: between these patches is the best channel, about 1 m. wide, and from thence, still by the edge of the reef about N.N.W., to the S.E. end of **Jenarbet**, and the small island to the E. of it. Beyond these begins an extensive reef, near the middle, forming two channels; that, near the coast, being about 400 yards wide, with 5 fathoms in it. This is considered to be the best, but the W. one is wider. Either may be used, as most convenient, according to the direction of the wind: but a strict look-out for the shoal patches is absolutely necessary, particularly in the W. channel. Off **Jilargin** the channel is 2 m. broad; and at this place good anchorage may be had, if necessary. From hence to **Leet** the coast is entirely bordered by a reef; and there are several patches scattered about in mid-channel, leaving a clear space of only 2 m. between them and the Outer Reef. **Raker** has a good anchorage, which may be taken if necessary. Directions for it, and also for **Leet**, will be found on page 175.

Notice. Having completed the Inner Channel, so far as **Leet** and the N.W. end of the Outer Reef, we return to the S., and commence with the patches, shabs, and islands, on and near the Outer Reef. The chart must be principal guide as to their position, many being without names.

ISLANDS AND CORAL REEFS BETWEEN LOHEIA AND LEET.

Loheia and the islands **Bowahrid**, **Entookfash**, and **Kotáma**, are described at page 170.

Hamar Island, about 4 m. N.W. of **Loheia**, is low, about $2\frac{1}{4}$ m. in length, N.E. and S.W., and $\frac{1}{2}$ m. wide, having a fishing hut or two on its W. side. There is a small bight in the reef off its N.E. part, affording anchorage for small boats; also a little reef on the E. and W. sides, but it extends off the S.W. part nearly a mile towards the E. part of **Bowahrid Island**; therefore, when passing between it and **Bowahrid**, keep nearest to the latter island. Fire-wood may be had for cutting on **Hamar**, but no water. West from **Hamar** 9 m., and about 3 m. N. of the centre of **Entookfash**, is the low, sandy island, **Tullowain**, with a little rise on the E. part, and surrounded by a reef extending from it nearly a mile. N.E. by E., 6 m. from **Hamar**, is a small island near the coast-reef, and N. of it one mile is a rocky patch. Another rocky patch lies $3\frac{1}{4}$ m. E. of **Hamar**. Five miles to N.W. of **Hamar** is the low, sandy island, **Dorama**; and nearly 3 m. N.N.E. from it is **Adjuah Island**, its S. end being the highest part; and $3\frac{1}{4}$ m. further, N. by E., is **Zoorbat Island**, upwards of a mile in length, and very narrow. These three islands are on the E. edge of a narrow shoal bank, with 4 or 5 fathoms close to the E. of it. E. by S. of **Zoorbat**, about $3\frac{1}{4}$ m., or 8 m. to N.N.E. of **Hamar**, is a small sand-bank or island, called **Dyer Island**, and to the S.S.E. of it are two others of the same description, occupying a space of 2 or 3 m., and each of them surrounded by a reef. There is a narrow passage of 6 or 7 fathoms between **Dyer Island** and the other two, but it is best to pass either to the E. or W. of them. At 6 m. to S.W. of **Zoorbat**, and to the W. of **Adjuah**, are the two **Beree Islands**, small and low, with a fisherman's hut on the N. end of the inner one: they are surrounded by reefs, and have 17 fathoms between them. N.E., 3 and $4\frac{1}{4}$ m. from **Zoorbat Island**, are the islands **Jurab** and **Raki**, two low, sandy spots, with reefs off them, extending 1 m. to the W.; and 1 m. S.W. of **Jurab**, is a small, rocky patch. To the N.W. of **Raki**,

about $2\frac{1}{2}$ and 3 m., are the low, sandy islands, **Zajj** and **Zoha**, situated on an extensive bank of irregular soundings; 1 m. to the N. of Zajj is a 2-fathom patch, and $3\frac{1}{2}$ m. in the same direction from it is an extensive 1-fathom bank. **Shab Nusseeb** is a shoal about 2 m. long, nearly dry in some parts, and has a small patch above water, about 2 m. E. of Jurab.

BAHS, or BAACE, in lat. $16^{\circ} 0' N.$, lon. $42^{\circ} 39' E.$, is a small island, situate on the S. end of the innermost part of the Outer Reef, and has a patch of 1 fathom $\frac{1}{2}$ m. S. of it, and also a patch 2 m. W.N.W. from it, on a point of the reef about 3 m. E. from Zajj; S.W. of the last-mentioned patch, about $\frac{1}{2}$ m., is another, having a channel of 13 fathoms between them. Bahs is about 5 m. off the coast-reef, which is here the breadth of the Inner Channel, with a depth of 5 to 12 fathoms. From Bahs, the inner edge of the Outer Reef runs about 14 m. N., to a point on which there are 5 fathoms, about $4\frac{1}{2}$ m. off Ras Musahrib; but the channel is only $2\frac{1}{2}$ m. wide between it and the reef that extends about 2 m. off the Ras. N. by W. of Bahs, distant $6\frac{1}{2}$ and $8\frac{1}{2}$ m., are the islands **Abou-Shejer** and **Gorab**, and about 2 m. S.W. of the latter is **Abou Shad**. **Gutherban** and **Haw-roof** are two small islands, lying a little to the N. of Bahs. All these are low, sandy islands, situated on the inner part of the Outer Reef, between which, also to the N. of them, are many dangerous patches, rendering it unsafe to attempt to pass over the reef in this neighbourhood.

Loban Island, in lat. $16^{\circ} 52' N.$, lon. $42^{\circ} 18' E.$, lies N., at the distance of 10 m. from Kotama Island. Loban is composed of coral rock, with a layer of soft earth and sand on the top; it is low, and of inconsiderable dimensions, the water having made passages through the lowest part, and part of the sides are broken down. The reef upon which it is situated extends $\frac{1}{2}$ m. off the N. end, and nearly 2 m. from the S. end, with 18 fathoms close to. South of the island $4\frac{1}{2}$ m. is the N. end of a shoal, with 8 fathoms on it, from whence it extends S. There are 25 and 30 fathoms between. Loban stands about 10 m. within the edge of the plateau, called the Outer Reefs.

TOAG ISLAND lies about N. by E., distant about $9\frac{1}{2}$ m. from Gorab Island, and 4 m. from the coast-reef, with deep water all round it, and may be passed on either side; it is about 4 m. N. of the N. point of the reef, which lies $4\frac{1}{2}$ m. to the W. of Ras Musahrib. About N.N.W., 4 m. from Toag, is **Ashig Island**, with two others lying in the same direction, at $\frac{1}{2}$ m. and 2 m. from it. These islands are on a narrow bank, which extend about 7 m. N. by W. of Ashig, and $1\frac{1}{2}$ m. to the S. of it, the N. part having from 2 to 5 fathoms on it. Between this bank and the coast-reef, the Inner Channel is from 4 to 5 m. wide, with 8 to 10, or 12 fathoms in it; but, like Toag, it may be passed on either side. About N. $\frac{1}{2}$ W., 12 m. from the N. end of the last-mentioned bank, is the little island **Dahret Jafree**, with 10 fathoms all round it; and 2 or 3 m. to the N.W. of it, the islands **Jafree** and **Gateya**, situate on a bank, with 2 fathoms between them. These are also about 5 m. from the coast-reef and may be passed on either side, there being 10 fathoms within, and 25 to 30 on their outside. The inner edge of the Outer Reef, from abreast of Ras Musahrib, forms a bight with deep water to the S.W., and then extends N. to lat. $16^{\circ} 23' N.$ From this point of the reef, **Sail Seya** bears W., 3 m.; and the sea is apparently clear of shoals to the N., towards **Dahret Jafree**. It thence turns to the W. very irregularly 13 m., to **Sail Rubah**, and then to the S. in the same irregular manner to **Sana** island; then more to S. for some 20 m., and thence E. and N.E., round to Bahs Island, having several islands and patches on it, but no clear channel. The chart will indicate these islands; a full description will be of little use. **El Bother**, is a high, remarkable rock, about 5 m. W.S.W. of Toag. **Tokaila Islands** are two in number, which are also high and rocky, situated to the N.W. of El Bother; the smaller, distant 1 m. from it, is of triangular shape, and nearly $1\frac{1}{2}$ m. long and $\frac{3}{4}$ m. in the broadest part. The larger island is more of a horse-shoe shape, and upwards of 5 m. in circumference; it has a small village, a mosque, and some wells of brackish water. **Jebel Jing** and **Mafagain** are two small, high, and rocky islands, S.W. of Tokaila Islands, situated on a bank of shallow water.

Fusht Island lies to the S.W. of these, in lat. $16^{\circ} 11' N.$, and lon. $42^{\circ} 20' E.$; it is $2\frac{1}{2}$ m. in length, and 1 m. in breadth, at the S. end, and is of good height. There is a small fishing village, with a mosque in the centre of it; and near the village are some wells of brackish water. On the S. part of the island is a well of good water, but it is difficult to be obtained, the landing-place being rocky. About 7 m. W.S.W. of Fusht is **Sana Island**, situated on the outer edge of the reef, in lat. $16^{\circ} 7' N.$, lon. $42^{\circ} 14' E.$ (See page 167.)

To the N.W. of Fusht are the islands of **Erthain**, **Zimer**, **Beree**, and **Rafer Beree**, which are situated upon the centre of the banks, with very irregular soundings, and in some places only 2 fathoms. **Erthain** is long and narrow, and rather high, 4 m. W. of Tokailah. **Zimer Island** is of a triangular shape, about 8 m. in circumference; and about 1 m. N. of it is an island about 1 m. in extent. Between Zimer and Erthain is another small island. On the W. side of Zimer is a small village and some brackish water. Antelopes are plentiful. The bank on which these four islands are situated is very shallow; there are from 3 to 15 fathoms between it and Tokailah, 13 fathoms

to the N., 4 to the W., and 58 fathoms close to the S. of it. **Sail Rubah** is 3 m. to the N. of Zimer, and another islet stands between. There is a good channel between these and the Beree islands.

Dhu Dafr and the **Zoorats** are situated upon a bank of sand and coral soundings, shaped like a man's leg and foot, 3 m. to the W. of **Sail Seya** Island. The depth between the two Zoorat Islands is from 2 to 4 fathoms, and to the N. of them from 6 to 13 fathoms. Just outside the calf of the leg are three rocky patches, and between them and the reef N. of **Sail Seya** is also a rocky patch. There is a deep channel on either side of this leg-bank, and the W. one is bounded by an extensive bank, which runs down towards **Sail Rubah**, leaving a channel between its S. point and that island, leading to the W.

Rafer Beree is the W. or outer island of the cluster now being described. Its S.W. point is in lat. $16^{\circ} 16' N.$, lon. $42^{\circ} 9' E.$; it is about $2\frac{1}{2}$ m. in length, N. by E. and S. by W., of irregular shape, and about a mile broad. About $1\frac{1}{2}$ m. E. of it is **Beree Island**, of similar length and breadth, with a small island and some rocks between their S. ends. At the N.E. end of the bank, and $3\frac{1}{2}$ m. from Beree, is **Maran Island**, and to the N.W. of that lies **Remain Island**. But there is no channel over this bank to the S. of the S. Dahret Simer and Muzaguf.

Dahret Simer, and **Simer**, are two islands that may be said to connect those just described with the Farsan group. As other two contiguous islands, with similar names, stand about 100 m. further to the N.W., it is well to define these as the S. Dahret Simer, and the S. Simer.

The **S. Dahret Simer** is a low sand and coral island, about a mile in length, surrounded by a reef, and about 6 m. to S.W. by S. from Muzaguf. There is a cluster of rocks about 4 m. to N.N.E. of it. **Muzaguf**, about 1 m. in length and $\frac{1}{2}$ m. in breadth, is in lat. $16^{\circ} 34' N.$, and 20 m. from the Arabian coast. It has four islets to the W. of it, and they are all situated on a shallow reef. To the W. of these islands is a channel, in a N.N.E. direction, with 7 fathoms in it. **Dahret Jafree** and **Jafree Island**, with **Gateya** or **Gutheir**, have been mentioned as standing on the W. side of the Inner Channel, distant 5 m. from the shore reef, having soundings of 12, 8, 4, and 2 fathoms between. The two latter are situated upon one bank, upwards of 2 m. N. and S. and $1\frac{1}{2}$ m. wide, with 2 or 3 fathoms between them. **Dahret Jafree** is surrounded by a separate reef, and there are 10 fathoms between it and the others. **Amnah Island** is 8 m. N.W. by W. from Gateya, with a small island to the S. of it, and a rock about a mile E. of its N. end. From 1 to 2 m. N. of Amnah, and abreast of Gheesan, there is a cluster of five islands, the N.W. called **Omel Curra**, or **Ohm-el-Kurh**, and the N.E. **Omel Currip**, or **Ohm-el-Garib (Karib)**: these five islands are situated upon a sand and coral bank, and there is a passage between them and the southern two, with 9 to 13 fathoms' depth. N.N.W. of Omel Curra, upwards of a mile, there is a 1-fathom patch; and there is a sunken patch at the same distance, S.W. of the island. **Ras Gheesan** (see page 171), a projecting point of the coast, lies $5\frac{1}{2}$ m. to N.E. by E. of Omel Currip. The narrowest part of the Inner Channel, between Omel Currip and the shore-reef of Gheesan, is 4 m. wide, with 9 to 14 fathoms. Remarks, about entering this Inner Channel from the centre of the Sea, will be found at page 154.

Jezirat Hibar Island, about $\frac{1}{2}$ m. square, and surrounded by a reef, is $7\frac{1}{2}$ m. W. of Gheesan, and $3\frac{1}{2}$ m. to N.W. of Omel Currip. About 5 m. W. of Jezirat Hibar is the E. edge of a triangular-formed bank, about $6\frac{1}{2}$ m. N. and S., having six islands on it. On the S. point is **Sail Shertef**, about $\frac{1}{2}$ m. long; and $1\frac{1}{2}$ m. N.E. of it is **Doraker Island**, with 30 fathoms near its S.E. side. **Abou Shooogar** is near its N.E. end, and has 24 fathoms near its E. side. This is a very small island, composed of madrepore, cracked and broken into numerous pieces, forming deep clefts, through some of which the water passes; while others are filled with sand and earth, where some jungle trees have sprung up. The bank from thence extends about 5 m. W., with 16 fathoms on its extremity; but on some parts it is very shallow. The other three islands lie to the N.N.W. of **Sail Shertef**. **Abou Shooogar** is 7 m. to the S.W. of **Ras Toorfah**. (See page 171.)

SHOORAH ISLAND, in lat. $17^{\circ} 1' N.$, lon. $42^{\circ} 15' E.$, lies 7 m. to N. by E. of **Abou Shooogar**, and 3 m. to W. by N. of **Ras Toorfah**, which forms the extent of this part of the Inner Channel, with regular decreasing soundings from the island to the Ras, near which are 7 fathoms. **Shoorah** is a small and low island, situated upon the E. end of a bank of rocks and sand, extending to W.N.W. nearly 7 m., with soundings of 2 to 12 fathoms on it. The bank lies to W.N.W. towards **Gorab Bank**, and between them there is a channel of deep water 3 m. wide. **Gorab Island** lies W.N.W., distant $13\frac{1}{2}$ m. from Shoorah, and near the W. end of the bank just mentioned; it is rather high, and little more than $\frac{1}{2}$ m. in length, with a small black rock off its N. end. **Gorab Bank** is about 5 m. long and 3 broad, with irregular soundings of 9 to 20 fathoms, on rocks and sand.

Theran Island, or **Firan**, is $9\frac{1}{2}$ m. N.N.W. from Shoorah, 7 m. off the coast, and on the W. side of the Inner Channel. The highest part forms a steep bluff to the W., which is 60 ft. above the sea, and has 25 fathoms pretty close to it: a small bank extends off the N. side of the island,

with bad holding-ground. This island lies E.N.E., $9\frac{1}{2}$ m. from Gorab, and there is a good deep channel between it and Gorab Bank.

THE FARSAN ISLANDS are the largest all along this coast, and are situated upon the extensive banks W. of Gheesan. They are two in number, but may be considered as forming one island, being connected by a sandy spit of shoal water, across which camels frequently pass from one to the other. On the E. side of this spit is **Khor Hasaif**, and on the W. side **Khor Bakarh**. They are of very irregular shape, and will be better understood by the chart than by any written description. The W. one is **Farsan Kebeer**, upwards of 30 m. in length from N.W. to S.E., in lat. $16^{\circ} 54' N.$, lon. $41^{\circ} 47' E.$ **Farsan Segeer** is on its N.E. side, 18 m. in length, and extends to lat. $17^{\circ} 1\frac{1}{2}' N.$ Although their whole breadth is only 12 m., they measure round their edges 130 m. The S.E. point lies 26 m. S.W. by W. from Gheesan, and N.W. 9 m. from Dahret Simer Island.

Hills and Land-marks. The land of Farsans of considerable height, interspersed with some plains and valleys. The hilly parts are coral rock, the most remarkable of which is **Jebel Cassar**, a small, round hill, E. of Tibtah Bay; **Jebel Marabah**, a table hummock, on an island near Farsan, about 5 m. N.E. of Tibtah Bay. **Jebel Munthak**, 11 m. N.W. of the last-mentioned, is a high island, lying in an E. and W. direction, having on its N. side the entrance to Khor Suggeed. **Jebel Momed** is a high hill, like a quoin, on the E. point of an island of that name, standing 3 leagues to the N. of the N.W. part of Farsan Kebeer. **Jebel Deesan** is a high hummock, on the S. part of **Jeziirat Deesan** island, off the N.W. part of Farsan Kebeer, and forms the S.W. side of the entrance to Khor Bakarh. **Jebel Suffer**, or **Safar**, is an elevated part of the island to the N., with a tree on its top, and is to the S.W. of **Sail Abado** Island. Remarkable Bluff is of quoin-shape on some bearings, and from the S. appears like a hummock with a peak in the centre; it is situated on the S. end of the island, on the E. side of the E. entrance to **Goomah** or **Tibtah Bay**; there are also three remarkable trees 2 m. to S. of **Jebel Cassar**.

Channel. About midway between the S.E. point of Farsan Kebeer and Marabah Island, and near to Farsan, is the Island **Gomari**, situated on the W. side of a channel, through which vessels may pass from Gheesan to the S.W., and contrary. Half-a-mile E. of **Gomari** is a 2-fathom patch, and further E. are three other patches in the entrance of the channel, which, throughout, is about 2 m. wide. The shoals are numerous in this neighbourhood and about Farsan Island, and the eye must be the principal guide to a vessel entering either way. The surveyors seldom had much difficulty in seeing the reefs. Vessels, having occasion to enter this channel from the S.W., must avoid a bank that extends to the S. of the S.E. point of Farsan Kebeer $2\frac{1}{2}$ m., which from thence turns round to N.E., with 3 to 2 fathoms on it; the little Island **Hindeah** is to the E. of this bank, and 3 m. E.S.E. from the S.E. point of Farsan. At 1 m. S. by E. of **Hindeah** is a small island, surrounded by a shoal, and S.E. of it 1 m. is a patch of 1 to 5 fathoms.

Coolam Island bears due E. from the S.E. point of Farsan rather more than 3 m., with several small islands and rocks to the S., W., and N., at $1\frac{1}{2}$, 2, and 3 m. distance, on a bank that forms the E. and S. sides of the above channel. Off the bank, due W. of the S. end of **Coolam**, is a rocky patch in the channel, having 10 fathoms between it and the bank, and 15 fathoms on its W. edge. To the N.E. of **Gomari** is **Haffer**, a small rocky island, and a cluster of small rocky islands on the edge of the rocky bank, which extends about 5 m. to the E. of Farsan, and forms the N. side of the channel just mentioned. The N. islet of this cluster is called **Aboo Shoory**, and about $\frac{1}{2}$ m. to the N.E. of it is a bank of rocks and sand, with 3 to 15 fathoms on it; and between the S. end of this bank and **Aboo Shoory** there is no ground at 40-fathoms. The bank extends nearly 4 m. N.E., and is $1\frac{1}{2}$ m. wide.

Jebel Marabah Island lies to the N. of **Haffer**, and near a projecting point of Farsan Kebeer; it is about $\frac{1}{2}$ m. long, composed of rocks, and is the highest island in this neighbourhood. It has a flat top or hummock of the barn shape, is surrounded by a group of small low islands, and appears from the N. as if part of Farsan Island. **Jebel Abdoolad** is a small rocky island to the N. of Marabah, and is also surrounded by a group of smaller islands; it may easily be distinguished by a knob or bluff on its S. end. This island and group are situated upon a bank off the Farsan coast, which extends from Marabah, and forms a tongue or point, 3 or 4 m. N. of **Abdoolad** Island, having between it and Farsan a bight of deep soundings.

Munthak Island, mentioned above, in lat. $16^{\circ} 49' N.$, is only about 3 m. in length, E. and W., and 1 m. broad at the E. end, tapering to the W., where it is only $\frac{1}{2}$ m. broad: it is high, and composed of coral. To the E. and the S. of **Munthak** is **Khor Hasaif**, running about 8 m. into Farsan Kebeer; it has from 5 to 8 fathoms' depth, but is narrow and full of shoal patches; there are also some rocky islands on the W. side of it, and two small rocky islands, $1\frac{1}{2}$ m. E. of **Munthak** Island, on a reef (projecting 4 m. to the N., off **Jebel Guttah**), which forms the E. side of the

entrance; this dangerous rocky spit runs nearly 8 m. to the N. of these islands, being the extremity of the reefs on the N. part of Farsan Kebeer.

Khor Sugeed, or Segeer, to W. of Munthak Island, is an excellent harbour of more than 1 m. in extent, with 9 to 12 fathoms. Here is a small village and a grove of date-trees on its N. side, in which are many wells of good water. The houses are small, and built of coral, and are mostly in ruins; and there are no supplies to be obtained besides water. The anchorage is defended from all winds and sea; the entrance to it is $\frac{1}{2}$ m. broad, bounded on the S. by Munthak Island, and on the N. by five islets, off the most W. of which there is a rocky spit, extending to the S.W. $\frac{1}{2}$ m. into the bay, which must be avoided. There are some dangerous patches E., E.N.E., and N.E. of Munthak Island, distant from $3\frac{1}{4}$ to 4 m.; a vessel keeping in the line from Tahbik Island to the highest part of Munthak (bearing N.E. and S.W. from each other,) will clear them. The N. one of the five islets forming the entrance to Khor Segeer, bears W. by S. from the point of the spit. Having entered the bay and cleared the spit running off the W. islet, steer up to the N.W., and anchor off the grove of trees, in 12 fathoms, mud.

Tahbik, or Dthabuck, in lat. $16^{\circ} 54' N.$, lon. $42^{\circ} 3' E.$, bears N.E., and is distant 5 m. from the N.E. point of Munthak Island. At 1 m. to S.E. from it, there is a patch of 2 fathoms: W.S.W. $2\frac{1}{4}$ and 8 m. from this island are two rocky patches, which are the principal dangers in approaching Munthak Island from the N.

Sail Abado bears N.W. by N. 7 m. from Dthabuck, and S.S.W. from Gorab, distant 6 m. Dthabuck and Sail Abado are small coral rocks, of a round shape, and from 10 to 15 or 20 ft. high, spreading out at the top with a sharp circumference, and falling in considerably towards the base. They are called by some Pie Islands. A bank extends from Farsan Segeer to the E. of Sail Abado, consisting of shoal water and groups of small rocky islands.

Channels. Vessels coming from the N., must pass along the coast to Ras Toorfah; and thence steer to the W., to pass between Tahbik and Sail Abado; then for Munthak, if going into Khor Sugeed. There is a channel of deep water, 4 m. broad, between Jezirat Ahkbain and Gorab.

Vessels coming from Lobeia, or Hodeidah, should pass a mile or two to the S. of Dahret Jafree, and then steer N.W. by W. for 30 m. to Tahbik; on this course she will pass about 2 m. to the S. of Sail Shertef.

Jezirat Ahkbain, the N. and largest of the Farsan Islands, is 7 m. to the N.W. of Sail Abado, and $7\frac{1}{2}$ m. W. of Gorab Island. It forms a narrow strip $\frac{1}{2}$ m. broad, and 2 m. long, with two small islands off its N. end. The bank extends 7 or 8 m. to the N.W. of it, with shallow, irregular soundings. **Ras Ruseeb**, the N. point of Farsan Segeer, is in lat. $17^{\circ} 1\frac{1}{2}' N.$, lon. $41^{\circ} 48' E.$ W.N.W. from Ras Ruseeb, distant $4\frac{1}{2}$ m., is the E. end of **Jebel Momed Island**, which is 2 m. long and 1 m. broad; the E. part forms a high quoin-shaped hill, the other parts low ground of sand and coral. The Island is nearly surrounded by deep water, of 15 to 20 fathoms mud. A bank runs off its N. end, with 3 to 8 fathoms on it; and at $3\frac{1}{2}$ m. N. of the E. part of the Island there is a patch of 2 fathoms. **Khynah Island** is $5\frac{1}{2}$ m. W. by S. of Jebel Momed; it is a low triangular island of sand and coral, 1 m. broad, surrounded by five islets, two of which are off its N. end, and on the W. a larger one; one on the S.W., and one on the S.E. They are all surrounded by a coral reef, which is connected with the bank that runs to the W., from the N. end of Farsan Segeer, and on which also stand Ahkbain and Sail Abado.

Dahret Matrhai and Matrhai are two islands to W.N.W. and to N. by W. of Khynah.

The N. point of Jezirat Deesan, in lat. $16^{\circ} 58' N.$, lon. $41^{\circ} 37' E.$, bears S.S.E. about 3 m. from Khynah; its W. edge extends $4\frac{1}{2}$ m. to S.: it is of triangular form, nearly 15 m. in circumference, and is generally flat near the sea, rising gradually towards the centre, having at its S. part a remarkably high hill. The S.E. part of Jezirat Deesan is connected by a bank of shallow soundings with the N.W. point of Farsan Kebeer, and there are two small rocky islands between them, and a larger one on the S.E. part of Deesan, with a small boat's channel to the W. of it. The banks off the E. side have some dangerous rocks, but the other sides have deep water. A small island lies off its N. end, with deep water between them. On the S. side of the island are the remains of a village, consisting of about 100 houses, built of rough stones without cement, and near it a cemetery, containing about 1,000 Mussulman graves, and a tomb, enclosed by a wall. Neither wood nor water was found.

Triangular Island, standing in the same shoal bank, and bearing S.W. 3 m. from Ras Ruseeb, and 4 m. S.S.E. from Jebel Momed, is about 5 or 6 m. in circumference, on the S. edge of the bank that extends W. from Ras Ruseeb to Khynah Island. About midway between this island and Jebel Momed is an island about a mile in length, and three small ones due W. of it, all low coral islands. On the S. edge of this bank, and 4 m. to the W. by N. of the Triangular Island, is a patch of 1 fathom. It is about $2\frac{1}{2}$ m. from the N.E. side of Jezirat Deesan, and there is deep water

close to the S. of it. At 5 m. E. of Ras Farsan Kebeer is the N.W. part of Farsan Segeer, where there is a small village, called **Ketib**, on the highest part of the land. Between these is the entrance to **Khor Bakarh**, formed between the Farsan Islands, and runs in to the S.E. about 14 m. The outer entrance is between Khynah Island and Jezirat Deesan. There are irregular soundings of 4 to 8 fathoms in the innermost half, and the outer part has deep water. It is not advisable for ships to run entirely up, as some parts of it are so narrow, that they would have to warp a considerable way out against a N.W. wind. The bank which connects Jezirat Deesan with Ras Farsan extends 4 or 5 m. within the Ras, on the edge of which a ship may anchor in 16 to 20 fathoms, $1\frac{1}{2}$ or 2 m. E. of the Ras. At $2\frac{1}{2}$ m. E. of the Ras, and on the edge of the bank, is a small patch with 3 ft. water on it; and about $4\frac{1}{2}$ m. S.E. of the Ras, is the village of **Sayel**, with Jebel Sayel about 2 m. to the S. There are two or three wells of very good water just within the narrowest part of the Khor, close to the beach, on the W. side. The N.W. part of Farsan Kebeer is high and rocky. (See top of page 179.)

The Sarso Islands (described at page 168) lie 4 m. to S.W. of Jezirat Deesan. The N.E. one is called Sindi Sarso. They are two narrow coral islands, about $\frac{1}{2}$ and $\frac{1}{2}$ m. broad, and both of considerable height, the outer one being 160 ft. above the level of the sea, with sharp points of coral above the surface. The channel between them has from 14 to 20 fathoms in the middle, but is narrow and blocked up at the S.E. end by small islands and shoal water. It affords good protection from S. winds, but it is not advisable to anchor in it with N. winds, as there would be some difficulty in getting out. These Islands are situated on the E. verge of the extensive shoal water called **Sháb Farsan**, which extends hence about 10 m. to the W., and 18 m. to the N.W. There is a small rocky islet close to the W. of Sarso, about a mile from its N.W. point, which, from its singular appearance, is called **Cape Island**, or **Button Rock**, appearing like a button standing on its shank.

Umal Bisran is E. by S. about 6 m. from Sarso; this island is about 5 m. round, rather high, with a valley in the centre, into which the salt water flows; it abounds with wood, but there is no fresh water. It is about a mile distant from Farsan Kebeer, and N.W. of it from $1\frac{1}{2}$ to $2\frac{1}{2}$ m. is a bank, with 1 to 2 fathoms water on it. Nearly 3 m. S. of Umal Bisran is the N. part of **Zelfeef Island**, of about $7\frac{1}{2}$ m. in length, and 2 m. broad; the land is high, and a small cove runs up into the N.W. part of the island, from which fresh water may be procured, but with some difficulty; wood may also be cut here, and antelopes are to be found. Zelfeef is situated on the same bank with Umal Bisran and the shoal N. of it, which bank extends to the S.E., and includes **Doomsook** and **Goomah Islands**. There is a deep channel between this bank and Farsan, from 3 to 4 m. wide, and also a deep channel between it and the outer bank or reef, called **Shab Farsan**. To the S.W. of Zelfeef, on the reef, is a chain of low sandy islands running in a S.E. direction, with very shallow water about them. S.E. from Zelfeef $1\frac{1}{2}$ m., and on the inner edge of the same bank, is the island **Selwan**, about 2 m. in length, high, and of coral formation, having shallow water on the S.W., and deep on the N.E. side. E. by S. $7\frac{1}{2}$ m. from Selwan, is the island **Goomah**, having three high coral islands between, and on the same bank.

Goomah Island is of circular shape, and 9 m. round, with a deep gut or small khor on its S. side, and a rocky spit extending nearly a mile off its N. end, with 9 fathoms close to it, and less water towards the main. This Island is at the end of the deep-water channel, is of considerable elevation on its S. part, and has a remarkable sand-hill on its N. end, to the E. of which is a small fishing village. There are some wells of brackish water, but no cattle or other supplies. There is a very good bay on the N. part of the Island, called **Khor Goomah**, the E. part of which is called **Tibtah Bay**, affording protection from all winds. It is formed by a bight in the S. part of Farsan Kebeer Island, is 7 m. in length E. and W., and at the narrowest part is $1\frac{1}{2}$ m. broad, and the same distance from the N. end of the rocky spit on the N. side of Goomah and the main. The deepest water is on the N.E. side of Goomah, where in the centre are 18 fathoms. The rocky spit bears from the sand-hill N.E. by N. At the N.E. part of the bay is a well of fresh water, but it is very scarce. Farsan village is about 2 m. to the N. of it. In this part of Khor Goomah is **Tibtah Bay**; it is only a small merza for boats. Jebel Cassar, bearing E. by S., is the leading mark for the harbour. Supplies of any kind are not procurable here. Nearly 9 m. S.S.E. from Goomah is **Doomsook Island**, situated on the same shallow bank. This Island is high, about 7 m. in circumference, with a khor in it of 15 and 20 fathoms mud, which nearly divides it in two: there is no fresh water, but plenty of antelopes. To the S. of Domsook are two circular banks, in the centre of the deep channel: the least water found on them is 6 fathoms, sand and rocks. Domsook is 11 m. to the N.E. of **Murrak**, one of the outer islands on the **Outer Reef**. (See page 168.)

Ohm-az-Zahil and **Mahamah** are two little islands between Domsook and Murrak; they are situated near the inner edge of the Outer Reef, about 1 m. apart, with 6 fathoms between them.

ISLANDS AND REEFS BETWEEN RAS TOORFAH AND LEET.

Ras Toorfah and Shoorah Island have been described (at pages 172 and 178.)

Theran, or Firan Island, in lat. $17^{\circ} 9' N.$, lon. $42^{\circ} 10' E.$, stands $9\frac{1}{2}$ m. about N.N.W. from Shoorah, and 7 m. from the coast. It is 60 ft. high, and has deep water (25 fathoms) pretty close to it. (See also page 176.)

Rocky patches on W. side of Inner Channel. The first is a patch of 2 fathoms, lying N.W. $7\frac{1}{2}$ m. from Therán Island, and 11 m. from shore; 18 fathoms are close within it. W. about 2 m. from this patch is another, a rocky patch, of 2 to 4 fathoms, with 30 fathoms between them. At about 2 m. farther N.W., is a rocky patch ($2\frac{1}{2}$ m. across,) with 3 or 4 fathoms on it, and 18 close to the W. of it. W.N.W. 22 m. from Therán Island is the S. end of **Mamali Segeer**, a narrow coral reef, over which the sea breaks in some parts, extending about 10 m. N.N.W., with a rock about 15 or 20 ft. above water at the N. end called **Mutbarhain**. E. by S. 13 m. from Mutbarhain, or 18 m. to N.W. by N. of Therán, there is a 3-fathoms' patch, with 33 and 36 fathoms close to it; this is 13 m. from shore. One m. S. of Mamali Segeer is a rocky patch, with 47 fathoms between; and from $3\frac{1}{2}$ to 5 m. to the E. of its S. end are three rocky patches. At 5 m. N. by E. from Mutbarhain, is the E. end of **Mamali Kebeer Shoal**, extending W. by N. 9 m., of a triangular form, being 5 m. wide at the W. end, which lies N.E. and S.W.; it is full of patches, with deep water between them. This shoal lies 13 m. from shore, to the S.W. of Mukérah. A rocky reef lies to the N.W. of Mamali Kebeer; it is S.S.W. 10 m. S.S.W. 10 m. from Kotumbal Island, and the same distance from Widan (the nearest shore), it is about $1\frac{1}{2}$ m. long; and to the S.E. of it 1 m., there is a rocky patch, with 19 fathoms between them; there is no ground at 30 fathoms, at 1 m. within. To the S. of the latter, at 2 m., is a 4-fathoms' patch.

Caution. The chart alone can guide a vessel, if by an error in reckoning she finds herself amongst these dangerous shoals. They exist to the S.W. of Mutbarhain, at 10 m.; to the W. of Mamali Kebeer, at 10 to 15 m. Others to the S.W. and W.S.W. of Simmer, at 12 to 14 m., or half-way to the Wusaliat Islands. Others half-way from Dahret Simmer to those islands: and again several clusters from Dahret Simmer to the N.W. by W. to within a few miles of Dahret Abou Masáli; (page 168.) We may repeat then that there is no safe channel across this outer plateau between the Farsan Islands and Abou Laad, the nearest island to Leet.

N. Simmer Island, in lat. $17^{\circ} 47' N.$, lon. $41^{\circ} 23' E.$, lies W. by S. distant 19 m. from Widan, or W. by S. $\frac{1}{2}$ S., 15 m. from Kotumbal Island. This Island is $1\frac{1}{2}$ m. in length, E. and W., and half-a-mile wide; it is very low, composed of coral and sand, and principally covered with decayed wood. The soundings are deep around it; and if anchorage is required, it may be conveniently obtained either upon, or on the W. edge of, the shoal to the N. and the N.E. of it. There are two small rocky patches $3\frac{1}{2}$ m. S.E. of the Island. There is a shoal to the N. and N.E. of Simmer Island, 5 m. in length and nearly 3 m. broad: the soundings obtained on it are from 3 to 19 fathoms; but there may be spots with less. On its W. edge are 13 fathoms, mud, gradually increasing in depth to the N.W. This shoal commences about $1\frac{1}{2}$ m. N.E. of the Island, and there is no bottom at 50 fathoms midway between them. N.E. 6 m. from the Island, is a rocky patch.

N. Dahret Simmer Island, lies 14 m. to W. by N. from Simmer, surrounded by a reef, with 7 fathoms close to the N. of it. There is a rocky shoal, with 1 fathom, at $2\frac{1}{2}$ m. to the S.W.; and another to W. by N. $1\frac{1}{2}$ m. Another at 9 m. to W.S.W.; and several others to N. and to N.W.

Jezirat Mogid, in lat. $18^{\circ} 13' N.$, lon. $41^{\circ} 19' E.$; at 26 m. to N. by W. of Simmer, and 8 m. off Nahood Harbour on the coast, which bears E. by N. from Mogid; it is a low, sandy island, with a large reef round it, which is connected to a bank of rocks and sand that forms the W. side of the Inner Channel, and before spoken of. Ten miles S.E. by S. from Mogid is a rocky patch, on the S. end of the aforesaid bank; and, about $\frac{3}{4}$ m. S.E. from the last, there is a patch of 7 fathoms, at the distance of 4 m. from the coast-reef, having 30 fathoms and upwards between. From the rocky patch, the E. edge of the bank extends N. 12 m., narrowing the Inner Channel from 4 to $1\frac{1}{2}$ m. opposite Nahood, where the bank terminates. The S. end of the bank is narrow; but opposite Mogid its breadth increases suddenly, the E. edge extending nearly 6 m. from that Island. The depths on it are various and irregular, from 2 to 30 fathoms, the former being found $3\frac{1}{2}$ m. E.N.E. from the island; and there are 4 fathoms 2 m. N. of the rocky patch, with 26 fathoms between.

Shoals. W. of the S. end of this bank, about $2\frac{1}{2}$ m., is a rocky bank, 3 m. long, with 4 to 13 fathoms on it; and at 7 m. further to W. by N., there is another.

Ohm Kergan Bank (described page 173), has its S. end about 2 m. N. of Jezirat Mogid Bank. At 7 m. to N. of Jezirat Mogid, and nearly 4 m. W. of Ohm Kergan Bank, is the S.E. end of a half moon-shaped rocky bank, on which the five Hadarah Islands are situated, and which extends

from thence N.W. and N., about 7 m. The Hadarah Islands are low and sandy, and covered with bushes, giving name to the bank on which they are situated. **Gad Hadarah, or Kadd Hadarah**, the N. one, is a low, sandy island, with an extensive reef lying N.W. and S.E., having a channel between it and the N. end of Hadarah Bank, with 14 to 23 fathoms, water. Nearly 3 m. E. of Gad Hadarah is a similar Island, on a reef that extends N.W. from it a short distance. Nearly 2 m. E.S.E. from this island is a patch of 2 fathoms; and at $\frac{1}{2}$ m. to S. by W., another of 1 and 3 fathoms, with a channel of 17 fathoms between; and 2 m. E. of the S.E. of the Hadarah Islands, there is a patch of 1 fathom.

Ul Gereef is an extensive rocky bank, full of dangerous patches, upwards of 8 m. in length, N. and S., and 4 m. in breadth; it lies 5 or 6 m. S.W. of the Hadarah Bank, and 8 m. to the W.N.W. of Jezirat Mogid.

Jezirat Gootna lies about 9 m. W.N.W. from the Hadarah Islands; its S. point is in lat. $18^{\circ} 27\frac{1}{4}'$ N., from whence it extends nearly 5 m. N., and is nearly 2 m. wide in the broadest part. It is a low coral island, with bushes, and is surrounded by a reef which extends off nearly 8 m. to the S.E., with some large rocks above water, like small islands, and several shoal patches beyond, which lie out at 7 m. to the W. of Gad Hadarah. The soundings to the E. of Gootna are 30 and 35 fathoms, mud, decreasing gradually to the coast. The other sides have deep water.

Jebel Sabyar is 2 m. N. of Jezirat Gootna, and is about 2 m. square and 60 ft. high, sloping a little at the top, towards its rugged sides. On its W. side is a village of fishermen's huts.

Ferandeer Islands bear N. by W. nearly 5 m. from Jebel Sabyar; they are two small oblong, irregular, table-topped, black rocks, about 40 ft. high, situated upon the outer reefs; and N.N.W., about 5 m. from these rocks, is the low sandy island **Dubarah, or Dubareh**. To the N.W. of this island, the central portion of the Outer Reefs plateau (right away to Abou Laad) is a complete blank on our charts.

Intricate channels. Between the Ferandeer Islands and Jebel Sabyar, between Jebel Sabyar and Jezirat Gootna, and between the latter and Ul Gereef Bank, there are said to be intricate channels, leading to the W. and S.W. to sea, passing between sand-banks and dangerous patches of sunken rocks; but the pilot refused to take the surveying ship. By a single glance at the chart, it will be readily seen that there is not any safe or proper channel that ships could attempt.

The edge of the plateau, on which the Outer Reefs lie, trends above Ferandeer Island to N. by E., for some 9 m.; then to N. by W., for 15 m., where it is about 4 m. or 5 m. to the W. of Uhm-us-Saifa Island. This part, however, has been little examined, and the tracing of the edge, that bounds the Inner Channel, is merely an imaginary line.

Three islands, Doshágiya, Mooskah, and Tedkar, lie on the plateau to W.S.W. of Coomfidah, from 25 to 30 m.

Rocky shoals along the Inner Channel. Due E. from Ferandeer, about 6 m., or nearly in mid-channel, is the S. end of some rocky shoals, which extend to the N. about 4 m., the N. part being about 3 m. off the coast: they are in broken ridges, having some parts above water; and to the W. of these, 2 and 3 m., are three rocky patches. Three or 4 m. to the S.W. of Undáreh are some dry reefs, to the N.E. of which is Undáreh Reef, which shelters the anchorage, (page 173.)

The Moolgamaree (Uhm-ul-Gomari) and Uhm-us-Saifa Islands, and neighbouring patches, have been mentioned (page 173); all these patches are easily discerned. N.E., 2 m. from Uhm-us-Saifa Island, is a rocky patch, with 15 fathoms between. At 1 league to the E. by N. of Saifa, there is another islet, with a passage between it and the shore-reef. To the W. by S. from Coomfidah, at 1 m. and 3 m., three rocky patches lie. Also several patches and low islets extending 4 m. to the S. of that place; some of these are about 1 m. off shore, with from 6 to 12 fathoms between them and the coast-reef.

COAST FROM LEET, TO JIDDAH, AND GULF OF AHKABA.

Leet Harbour and Abou Laad, the island 11 m. to S.W. of it, (page 175), have been described. W. by N. from Leet, distant 8 m., is the E. point of **Shab-el-Jefeen**, which extends from thence for 8 m. in a W.N.W. direction, parallel to the long island, **Jezirat Kishran**, in patches to between Summar and Kishran. The soundings are mud about the E. point of this Shab, and a vessel can anchor on the inner part of its point, just to the S. of the discoloured water, but the locality must be guessed by the eye.

Two shoal patches lie at 2 and $2\frac{1}{2}$ m. to the S. of the E. point of Shab-el-Jefeen; these are dangers in middle of the Inner Channel entrance. A ship had better borrow towards Shab-el-Jefeen. The shoal, at the edge of the Outer Reefs, lies only 4 m. further to S. (*See Abou Laad*, page 169).

Summar anchorage is on the E. side of the shoal forming Kishran anchorage, and has 6 fathoms, mud. This is preferable to Kishran, which has a rocky bar at its entrance, with 2½ fathoms on it; the bar appears to connect the coast-reef off Kishran, with a shoal to the E. of it, by which the anchorage is formed, with 5 and 6 fathoms (mud) in it. In a S.W. wind, a heavy swell rolls into this place, and the surf breaks on the bar. Tower Hill bears N. by E. ¼ E. from the entrance.

Merkat is 11 m. N.W. from Kishran: the anchorage is just to the S. of the shoals off it, and affords a little shelter from W. winds. Marram is 8 m. N.W. ¼ W. from Merkat, and W. ¼ S. from Tower Hill: the anchorage is bad, there being straggling rocks in it. A vessel wishing to stop here had better anchor outside the rocks off it. **Detached reefs.** Many of these dangers lie off this coast. Two reefs lie about 8 m. to S.W. of Kishran anchorage. Another at 6 m. to N.W. of them. Another at 3 m. to the S. of Merkat. Two more off Ooshrah, midway between Kishran and Merkat. To the W.S.W. of Merkat, there is a cluster, and more at half-way to Shejer Reefs.

Shejer Reefs, a cluster of dangers, in lat. 20° 20' N., lon. 39° 34' E., lie about 5 to 7 m. off the coast, opposite Marram Village. The Inner Channel, between them and the Marram Reefs, is 3 m. wide. But to the E.S.E., towards Merkat, there are numerous shoals; and at 3 or 4 m. to the N.W., there is another cluster. Doubtless, many others exist, for this portion of the Red Sea has been little sounded.

KADD 'OMAIR, or **Gad Amare**, in lat. 20° 16' N., lon. 39° 24' E. (the N.W. extreme), is the outermost cluster of breaking reefs to the W. of Leet. It extends for 2 m. to the S.E. This cluster lies 10 m. to the S.W. of the Shejer reefs, and 17 m. off the Hedjaz coast. From Kadd 'Omar the Tower Hill bears E. by N. ¼ N., distant 33 m.

Tawil Raghwan, a remarkable reef, 2 m. long, N.W. and S.E.; and lying 7 m. off shore, bears N. by W., 20 m. from Kadd 'Omar. Like this last reef, it may be frequently seen by vessels proceeding up or down the sea. Gutta-el-Raghwan is another patch, lying about half-way towards the shore of Raghwan. Further to the S.E. about 4 m., and at the distance of 2 m. from the coast, lies another reef, **Guttah-el-Aboo-Dooda**.

Aboo Shaok Reefs, to the S.W. of the village of that name, are about 10 m. to the N.W. by N. of Tawil Raghwan Reef. In this space, between the villages which give names to these reefs, several others exist, as the Bahair, Gad-el-Shaiba, Magradeeb, Gad-el-Goofs, and Mustabat Reefs. Channels do exist between them, but very difficult ones, and the shoals are so numerous that they may be considered as forming a connected line of shoals. Ships should not cross them.

The Coast. **Aboo Shaok**, or **Abbooshoke**, is 34 m. N.W. by N. from Marram: this place has excellent anchorage in 6 fathoms, but the entrance is very narrow between the reefs off it. **Jebel Aboo Shaok** bears from this place E. ¼ N. Between Marram and Aboo Shaok are Shejer, Amare ('Omar), Sodah, Aboo Dooda, Raghwan, Shaiba, Bahair, Maktar-Rijmah, Goofs, and Mustabat. Three miles to the N. of Aboo Shaok is **Geedan**, where there is anchorage, tolerably sheltered, in 4 fathoms, from W. winds, but open to the S. **Jebel Aboo Shaok**, bearing E. from this anchorage, is a small two-knobbed hill, about 12 m. from the coast. **Mersa Goofs** is only a small bight in the coast-reef, about 8 m. to the S.E. of Geedan: the anchorage is in 11 fathoms, on rocky bottom, but affords no shelter. **Samaima** is 22 m. N.N.W. from Geedan, and 14 m. to the S. of Jiddah. The anchorage in the roads affords tolerable shelter in 9 fathoms, mud. From Samaima the coast trends about N. by W. nearly 5 m.; it then turns in N.E. 1½ m., and then suddenly to N. by W. 2 m.; forming a low sharp point, called **Ras-el-Aswad**, from which Jiddah bears N.N.E. 8 m.; and from Jiddah the coast trends N.W. 3 m. to **Ras Gahaiz**. Between these projecting points the coast forms a bay, bordered with a reef, in which are several others, forming channels and anchorages. S.W. 1½ m. from **Ras-el-Aswad** is the little island, **Jezirat Gorab**, situated on the shore-reef.

Off-lying Reefs below Jiddah. Dangerous isolated reefs lie off shore; one of them is 9 m. off. **Gutta Geedan** is a cluster which lies 8 and 9 m. to the W.N.W. of Geedan, and at 12 m. to the N.W. of Aboo Shaok Reefs. There is also a reef midway between this cluster and the coast at **Dumroor**, off which place the coast-reef extends 1½ m. **Gutta Tuttefah** (**Kadd-et-Teffah**) Reef lies 1 league to the N. of the last, and 4 m. off shore.

A bank of soundings, 12 m. long N.N.W. and S.S.E., and 8 m. broad in its central part, lies about 4 m. off the coast, between the last-named reefs and Jiddah. On this bank there are three breaking shoals, with deep channels between; the **Benares** worked among and between them and the shore. The S. one, **Ulcusser Elyemmarneer** (**El-Kasr-el-Yemeniya**), or the **Right Castle**, lies 6 m. to the N.W. of **Kadd-et-Teffah**. The middle one, **El-Kasr-esh-Shamiya**, or the **Left Castle**, is 4 m. to N.N.W. of the other. The N. patch is a cluster of three or four shoals, called **Cobain**; all are breaking shoals. **Urgo Gorab** (**Irk-el-Gorab**) is a reef about 4 m. to N. by W. of **Cobain**, with no bottom at 120 fathoms close to its W. side. It lies 4½ m. to S. by W. of **Moosmari**. These are both breaking reefs, requiring particular attention when proceeding to or from Jiddah.

Mountains and Landmarks. Jebel Sardeeah is a remarkable peak on the highest part of the land in the distant range to the S.E. of Jiddah and to the N.E. of Marram; and a little to the E. of it is a peak, still more remarkable, by which it may be known. Sugar-Loaf is a peaked mountain, its tops forming three small peaks, to the E. of Kishran: it is in one with Jebel Sardeeah and Tower Hill. The range of hills from the N. converge towards the coast between Marram and Kishran, and the Tower Hill is a little inside the extreme of the range at Marram: it is a remarkable piece of broken land, not unlike a tower; but off Kishran, and to the S.E. of it, it forms with a double rugged top, and appears much larger in this last direction: the piece of land outside of it forms two round hills. First and Second Peaks are S. of Tower Hill: those at Marram are the highest peaks on two sloping mountains, like quoins: they both form with two peaks each. At Kishran there is a peak on the second range, called West Peak: it is between the first peak and Tower Hill; and the second peak in this direction forms a round mound on the high land to the right of the first peak, with a peaked elevation on each side of it.

Jiddah Land-marks. North Hill is a high hummock behind the N. extreme of the near range of hills. Oomarrar (Uhm Ahrar) is a rugged hill at the N. extremity of the near range of hills; it has something of the quoin shape, with its bluff to the N.W.; when in one with the former hill, it bears N.E. Jebel Yemeneer, or Sugar-Loaf, so called from its resemblance thereto, when in one with the mosque, bears E. by N. Jebel Addar, or Saddle Hill, is the highest land about Jiddah, and in the centre of the range; it is sunk in the middle with a N. and S. brow; the N. is in one with the Admiral's house on the N.W. extremity of the town when bearing E. Sonnam is a small peak on the highest part of the near high land, on the S. side of the bay, in one with Ras-el-Aswad and the Moosmaree Reef, when it bears E. $\frac{1}{2}$ N. There are many mosques or minarets, but the most conspicuous one in the centre of the town is the one used, and when in one with the flag-staff, bears N.E. by E. The flag-staff is planted in the fort at the S.W. angle of the town. The fort forms in two octagons, in the N. one of which stands the flag-staff; the other part is called the South Octagon, and the centre of it is on with the mosque when in the middle of the inner gate-way off the Berry Reef. The Eastern Tower is a low white building on the S.E. extremity of the town wall, and is not much higher than it; when it is in one with the Sugar-Loaf, it bears a little to N. of E. by N. Moosmaree is a breaking patch nearly 5 m. from the shore-reef, and the same distance from the rocky bank Maru-wiya, bearing S.W. close to the W. of Moosmaree. There is no bottom at 120 fathoms.

Jiddah is one of the most considerable places in the Red Sea; it is in the province of El-Hedjáz, situated in a low, sandy, and extensive plain, in front of a range of hills 10 m. distant from the sea; the land, farther in the interior being considerably higher and mountainous. The town, with its minarets, being white, has an imposing effect from the sea; it is enclosed by a wall $\frac{1}{2}$ m. square, with small towers at intervals, and the angles towards the sea are commanded by two forts, with about ten embrasures each; but there are few guns mounted. In the N. fort is a house, generally occupied by the officer in command of the troops; the S. one forms in two octagons joined; and in the N. part of it, which is the smaller octagon, stands the flag-staff. There are three entrances to the town on the sea side, of which the centre and only public one is that at the jetty, but the others are allowed to be used occasionally. There is also a gate on each of the other sides: that on the S. is seldom opened; the N. one is common to all; but to the E. is the Mecca Gate, through which none but the professors of Islamism are allowed to pass. On the N. side are three wind-mills, near which is an extensive tomb, asserted to be that of our mother Eve, and said to be 50 cubits long by 12 broad. The streets of this place are generally very narrow and irregular, and the houses are mostly composed of madrepore. There is an extensive bazaar, tolerably well supplied, and there is a bazaar-master; but strangers are often charged exorbitantly. The only scarce article is biscuit. Good water is scarce. Live stock must be obtained from Mecca. There is nothing considerable produced at Jiddah or in its vicinity, as an article of trade, but from Suez they receive the most useful European articles. The highest mosque in the centre of the town is in lat. $21^{\circ} 28' 20''$ N., lon. $39^{\circ} 12' E.$

JIDDAH HARBOUR is, perhaps, the most extraordinary of any so called, as to its figure, and is so well protected from all seas, that there is comparatively smooth water whatever winds may blow. It lies in a N. and S. direction, the utmost breadth being 780 yards; the narrowest part, facing the town, 340 yards; and the entrance to it, properly called the Gateway, is 250 yards. This space is part of a streak or narrow channel of irregular soundings, extending along the coast-reef, which is bounded on the N. by Ras-el-Gabaiz, to the S. by Ras-el-Aswad, and to the W. by many breaking reefs, small islands and sunken rocks, which have deep channels between them. The reefs to the W. of the harbour form in three clusters, containing innumerable patches, and running in a line parallel with the coast, stretching towards the two capes, whose distance apart is

10 m. On the S.W. part of the outermost cluster of these reefs, and distant from them $\frac{1}{2}$ m., is a dangerous patch of $1\frac{1}{2}$ and 2 fathoms, called **Maru-wiya**; and at 8 m. to the W. of the town, is the outer extremity of a bank of rocks and sand, with shoal patches on it, which is the W. danger off this part, and is hereafter fully described. The eye is the best guide to avoid the numerous reefs in clear weather. The tides are so influenced by the winds, that it is impossible to establish a correct period for the time of H. W. In Dec. and Jan., during strong S. and S.E. winds, the greatest rise or fall on the springs was about 2 ft.; but in the hot months, during the N. winds, when many of the banks are dry, there is less water by about 3 ft. than during the S. winds in the cold season.

DANGERS, WITH MARKS FOR AVOIDING THEM. The W. or Rocky Bank, is the outermost danger; its centre is 7 m. W. by S. from the great mosque. It is 2 m. in extent, N. and S., and E. and W. about 3 m. There are five rocky patches on it, namely, Al-Fokáni, Abou-l-Yahood, and Abou-l-Hodair; they are in a line, about E. by N., with channels from 9 to 17 fathoms between them. On the Al-Fokáni, the W. patch, there are 8 fathoms, on the centre one $2\frac{1}{2}$, and on the E. 6 fathoms. The other two patches are the Abou Nukla and Al-Wastani, which lie to the S. of the other three nearly 1 m., leaving a good channel between, with from 13 to 35 fathoms. On the first are $2\frac{1}{2}$ fathoms; on the latter, $1\frac{1}{2}$ fathoms in the hot season.

Passages inwards. The mosque just open to the right of the Sugar Loaf, bearing E. by N., leads across the bank between the patches. The mosque just open to the N. of the N. brow of the Saddle, leads on to the three N. patches, but open to the S. of it, just clears them: or the Admiral's house on with the N. brow of the Saddle, bearing E., leads just clear to the N. of the bank.

Saddle Hill, bearing E. by N., or Sugar Loaf, E. by N. $\frac{1}{2}$ N., leads clear to S. of the bank.

Oomarrar Hill, bearing N.E. by N., or Moosmari Reef bearing S.W. by S., is the fair channel course to the E. of the bank, and to W. of the Maru-wiya.

Moosmari Reef, in lat. $21^{\circ} 21' N.$, lon. $39^{\circ} 0' E.$, is a danger, requiring great caution in vessels approaching Jiddah from the S. at night. It is a breaking reef, lying 6 m. to the W. of Ras-el-Aswad, and 6 m. to the S.S.W. of the Outer shoal patches abreast of this port. Vessels coming from the S. should not stand in for the harbour till the Sugar Loaf bears to the E. of E.N.E., or till Oomarrar Hill bears to the E. of N.E. by N. **Caution.** Navigators must be warned that this reef has been hitherto omitted from the large-scale plans of Jiddah harbour.

The **Maru-wiya-Reef** is a sunken patch of $1\frac{1}{2}$ and 2 fathoms, lying rather over 3 m. to N.W. by N. of Ras-el-Aswad, and at $\frac{1}{2}$ m. to the N.W. of the largest of the breaking patches, called the Sha'bein; or it is upwards of $2\frac{1}{2}$ m. to the S.E. of Al-Wastani reef. The E. side of this line of reefs is connected by many sunken patches to the second cluster. The N. patch of this range is called the Ghaham or Jhaham Reef, and from it the mosque bears E. by N. $\frac{1}{2}$ N., distant $4\frac{1}{2}$ m.

These S.W. Outer Reefs are all breaking patches. Naming them from S. to N., they are Sha'bein, Maru-wiya, As-Samadiya, Ohm-el-Kaad, Shab Jiddah, and Jhaham. There is a channel between the Maru-wiya $1\frac{1}{2}$ -fathom patch and the breaking Sha'bein reefs. When Oomarrar bears about N.N.E., steering for it (with a good look out from mast-head) will conduct between the patches and carry the vessel a little to the W. of the Outer Gateway, which is in the second cluster of reefs. The mark to clear **Jhaham reef**, the N. end of the first or outer line of reefs, was the E. Tower on with the Sugar Loaf, but the N. end is now marked by a **beacon**.

The centre cluster of reefs, in which is the Outer Gateway, is more extensive than the former, and is also in patches, with many channels between them. The Gateway, which is 270 yards broad, has now a **beacon** on each side, from which the flag-staff bears about E.N.E., distant 3 m. This Gateway is between the Fellaha breaking shoals, with dangerous sunken patches on the S. When in the centre of this entrance, a patch (now **buoyed**) will bear S.E., distant 300 yards, which, with the other sunken patches on the S. side, is to be avoided, by passing along about 100 yards from **Fellaha** large breaking reef.

North entrance. There is a channel between the N. extremity of this second cluster of reefs and the coast reef off Ras el Gahaiz, and from thence to the S. to the Inner Gateway.

South entrance. There is also a channel between the S. extremity of this second cluster of reefs, called Shab Mahmood, and the coast reef off Ras el Aswad, and thence to N., passing the long reefs, Shab Saif and Abou Hareet, at 1 or 2 cables' distance, and up to the Inner Gateway. These two channels are constantly used by Arab baghalaahs; the *Benares* has been through them both. The entrance through this S. channel is $\frac{1}{2}$ m. wide throughout; but there are overfalls in both. For the S. Channel, the N. brow of the Saddle, bearing E. by N. $\frac{1}{2}$ N., and on with a little sand-bank or islet, called Wasta, lying $2\frac{1}{2}$ m. to the N.E. of Ras-el-Aswad, leads in clear of the S. ends of the first and second clusters of reefs; and having rounded Shab Mahmood, steer N. by E. for the Inner Gateway.

The Outer Gateway. The leading mark for the Outer Gateway was the mosque on with the outer angle of the Flag-staff Tower. **Beacons** are now placed there.

Inner Gateway. The inner cluster of reefs, in which is the Inner Gateway, now marked by **beacons** and **buoys**, has channels for small boats towards its N. and S. ends, and in the centre of the reef is the Double Gateway, as it may be called, for it is formed by four shoals, the two outer most of which are breaking reefs; that on the S. is Abou Hareet, that on the N. is Bahree.

About 300 yards from them further in is Berry breaking reef, with a sunken patch off it on the N. side of the Gateway, and a sunken patch lies on the S. side, both of which may be seen by a good look-out. This entrance is 250 yards wide, and the flag-staff bears from it a little to N. of E.N.E. It is the only entrance in the cluster for ships. When in the centre of the Inner Gateway there are two patches of 1 and 2 fathoms, in a line with the E. Tower, bearing E. by N. $\frac{1}{2}$ N.; the nearest is only 500 yards from the entrance, and is off the end of Berry, as already mentioned, and not more than 70 yards from it. The second is a rock of 1 fathom, $\frac{1}{2}$ m., or 1,000 yards off; it lies off the E. side of Berry, and the passage is between them, luffing round Berry reef to run up into the harbour; the distance between them is not above 400 yards. There is also a third small patch, bearing from the Gateway E.N.E., distant 1,200 yards; and a little to the N. of this is a shoal 500 yards long, with 1 fathom on it.

The flag-staff, a little open to N. of the Minaret, leads to the Inner Gateway. For clearing the Berry sunken patch, the flag-staff 20 yards, or half a ship's length open to the N. of the Minaret; or, the Minaret and the centre of the S. octagon in one; but the Minaret must not be brought on with the S. extreme of the octagon, as that is on with the shoal that forms the S. part of the Gateway.

Approaching and entering the Harbour. On approaching within 80 m. of Jiddah, the Saddle Hill will be seen, if the weather is clear; when its N. brow bears E. $\frac{1}{2}$ N. you will be off the harbour. In running up, get sight of the Moosmaree reef, but do not bring it to the W. of S. by W., until you are sure of the above bearing of the Saddle. When the Mosque is on with the Sugar Loaf, you may steer for them across the Rocky Bank between the shoals, which are easy to be seen. When clear of this bank the course will be about E. for 2 m., which will take you to the **Jhaham** breaking reef, and at 2 cables to N. of it the Outer Gateway bears E. $\frac{1}{2}$ S., distant $1\frac{1}{2}$ m. On approaching it, keep the Fellaha breaking reef on board, to clear the patches on the S. side of the channel, one of which bears E. $\frac{1}{2}$ S. from the entrance, distant only 300 yards. Therefore, after passing the S. point of Fellaha breaking reef, haul more to the N. to avoid them, but take care also to be clear of a sunken patch near the E. end of Fellaha breaking reef. A course N.E. by E. $\frac{1}{2}$ E., for 1 m., should carry a ship along the large breaking reef, and the sunken patch off its E. end, to the Inner Gateway. To avoid the patches within it, bear away to the E. the moment you are within the narrow outer part of the Gateway, and the course will be about E. by N. $\frac{1}{2}$ N., and bring the Flag-staff about 20 yards, or half a ship's length, open to the N. of the Minaret before you reach the nearest shoal (the Berry sunken patch), keeping it on your port hand, and a sunken patch will be on your starboard hand, which forms the S. side of the Channel of Berry. If the wind is at N.W., luff as close as you can with safety round the Berry sunken patch, close on the end of the Berry reef, as it is steep-to and easy to be seen, and keep along the edge of the Berry reef, to avoid the sunken rock 400 yards to the E. of it, and the other two patches which are near the shore reef on the E. side of the channel. But if the wind is S., the course up the harbour, after passing the Berry sunken patch, will be by compass about N.N.E., and ships may anchor with the Mosque from E. by N. to E. by S., in from $3\frac{1}{2}$ to 7 fathoms. The latter bearing of the Mosque is where native ships always lie, and is the most convenient for boats going to the shore; but it is just to the N. of the narrowest part of the harbour. There is a shoal spit, nearly dry at L.W., between this anchorage and the town of Jiddah.

To pass through the N. Turruck or Khor Zemir Channel. The following directions are added for passing inwards and to the N. of the second cluster of reefs, in case there should be a necessity for so doing; but there are alarming overfalls and patches in it, and a vessel would probably be longer in clearing the reefs by going that way than by going through the second Gateway. Run in with Mosque bearing E.S.E., or with **Jebel Widri** (a black, conical hill, to the left of Tenam Peak) on with the Admiral's house. Either of these marks will carry her in between **Gad-Ohm-el-Halal** and **Derkak Reefs** on the S., and **Ras el Mugulat Reef**, which stretches off Ras el-Gahais on the N. Having passed through these, haul a little to the S., about S.E., which will carry her through the Gateway formed by **Gad-el-Khor-Zemir** and **Toweelah** reef towards **Abou Humroom** shoal; and when midway between the latter two, haul up about S. by E., and keep a good look-out for a shoal-patch, which should then be about half a point on the starboard bow, and which bears about W. from the great Mosque. Having passed this patch, steer onwards about S. by E. for the Inner Gateway, and proceed in from thence, as already directed in coming from the S.

Pilots. When off the Harbour of Jiddah, if in want of a pilot, make the signal with one or more guns, as necessary, and they will come out. In running in they are mostly guided by the eye; for the channels are so narrow that the marks will be found of little use, except in approaching the place; and towards noon is the best time for going in, as, owing to the transparency of the water, the sunken rocks then appear as a dark green shadow on the surface, but which rocks cannot be discovered until close upon or close to them, when the sun is low to the E., and there is much glare, or in thick, hazy, or cloudy weather.

COAST OF ARABIA, FROM JIDDAH TO GULF OF AHKABA.

From Ras Gahaiz the coast runs to N., about 11 m. to **Sherm Oubhoor**, which runs in N.E. 5 m.. At 4 m. N. of the Ras the coast-reef ceases, and the shore is bold, there being no bottom at 70 fathoms, within 1 m. From Sherm Oubhoor the coast turns to N.W., and N.N.W., 14 m. to **Ras Dahlimar**, and thence N. $\frac{1}{2}$ W. 6 m. to **Ras Hartebah**, in lat. $22^{\circ} 0' N.$ and lon. $38^{\circ} 54' E.$

THE ELIZA SHOALS. Bearing N.N.W. 9 m. from Ras Gahaiz, is the S.E. point of the Eliza Shoals, from whence the inner or E. edge trends about N.N.W. and N.W. by N. about 21 m. to abreast of Ras Hartebah, forming the W. side of a deep channel, of 2 to 3 m. wide, between it and the coast. From 5 to 6 m., about W.S.W. from Ras Hartebah, and on the inner edge of these shoals, is a large patch of reefs and deep water, called **Guttah Degaiz**.

The S.W. point of this extensive bank, called Eliza Shoals, is in lat. $21^{\circ} 37' N.$, lon. $38^{\circ} 51' E.$, and is about 10 m. W.S.W. from their S.E. point and bearing W.N.W. 15 m. from Ras Gahaiz. About 3 m. N.W. from this S.W. point, and on the W. edge, is a reef about 3 m. in length, in the same direction, called **Shah ul Kebeer**, with no bottom, at 70 fathoms close to its W. side. All the S.W. part of these shoals have breaking rocky reefs, with deep water close to them. Reefs and shallow patches extend also to the N. by W. for 8 or 9 m. from Shah ul Kebeer. About N.W. by N., 11 or 12 m. from it, and also on the edge of the bank, is another reef, in a N. and S. direction, called **Aboo Farhamish**, near which is good anchorage, in lat. about $21^{\circ} 52' N.$; but only a Pilot could take a ship there. From hence the W. edge of the Eliza Shoal takes a N. direction, to its N.W. point, where there is a reef called **Aboo Murdafer**, where there is good anchorage, sheltered from N.W. winds. This is the N. Eliza Reef; its W. end is in lat. $22^{\circ} 2' N.$, and lon. $38^{\circ} 42' E.$, from whence it extends 3 or 4 m. in an E.N.E. direction, in a narrow line.

A ship from the N., if a good look-out be kept, may with safety take advantage of the Inner Channel already mentioned, between the Eliza Reefs and the low, sandy coast, fronting them, it being from 2 to 3 m. wide, with no bottom at 60 and 70 fathoms, and both sides bold-to. Should night come on before a ship is through this channel, she may haul a little to the W., and anchor as most convenient under the lee of any of the reefs, keeping in mind that the range of reefs which form the W. side of this channel, where anchorage may be had, terminate in lat. $21^{\circ} 46' N.$, when two remarkable hills with peaks on them, called the Sisters, which form the most N. high land near the coast, bear about E. or E. by S. To the S. of this at 6 m., are only a few patches, which do not afford good anchorage from N.W. winds. The N. entrance to this channel lies close to the W. end of the N. Eliza Reefs, **Aboo Murdafer**. A course about E. by S. for 6 m., and then for Ras Dahlimar when it bears about S.E., with soundings from 20 to 40 fathoms, will lead into the channel; when you have no soundings, a course may be steered to S.E. by S., close along shore, to the reefs of Jiddah.

In passing close along the coast, the inlet, called in the old charts Charles River, but by the Arabs, Sherm Oubhoor, will be observed, which is an extensive inlet of the sea. The entrance is narrow, and so it continues some distance up, with soundings from 18 to 25 fathoms in it, and then widens into some beautiful bays; but it would not be prudent to anchor here, it being difficult to quit with a light land-wind, if there is any swell at the entrance, which is generally the case after hard N.W. winds. In other respects, vessels may lie quite land-locked inside, with scarcely space to swing, except in the upper part, which is distant from Jiddah Mosque 14 m.

The Coast from Ras Hartebah trends to the N.E. and N.N.E. 21 m. to **Ras Mahluk**, a low sandy point, forming between them various Mirzas of considerable extent, but difficult to approach, on account of the numerous reefs and shoals with which all this part of the coast is bordered, extending from 6 to 8 m. from shore; there are, however, some channels among them. A channel lies close to the W. side of **Heyga**, a low sandy island, which is 3 m. N. by E. of Ras Hartebah, and it leads out again into a large channel 5 m. to the N. of **Haramil**, which is a similar low island, where these reefs terminate, at 9 m. to the W. of Ras Mahluk. Haramil Island is low and sandy, and covered with bushes, in lat. $22^{\circ} 15' N.$, lon. $38^{\circ} 56\frac{1}{2}' E.$ About 5 m. N. by W. from Ras Mahluk, is **Ras-ul-Khoormah**, also low and sandy, forming on its S. side a bight in the coast full of shoals; and about 3 m. to the N. of it, the coast-reef which began at Ras Dahlimar terminates.

From Ras-ul-Khoormah about 12 m. to the N. is **Merza Deneb**, where good anchorage may be had in 7 to 10 fathoms. From hence the coast takes a N.W. by N. direction, and at the distance of 8 m. is **Sherm Rhabuc**. All this part of the coast is a low sandy desert.

Shab Nazer Reef, the S. end, in lat. $22^{\circ} 19' N.$, lon. $38^{\circ} 50' E.$, bears N.N.E. from the W. end of the N. Eliza Reef, at the distance of 19 m., and N.W. by W. from Haramil Island 8 m. On the N.E. side of Sháb Nazer, there is indifferent anchorage. From this reef, to the N.N.E., to the distance of 23 m., numerous reefs exist on a bank or plateau of soundings, with passages and anchorages among them: their W. edge preserves nearly a straight line, and there is no bottom at 40 or 50 fathoms outside them. This plateau of reefs is from 2 to 5 m. broad, and a little to the W. of their N. end, in lat. $22^{\circ} 38' N.$, and lon. $38^{\circ} 51' E.$ lies a large reef called **Aboo Sahain**, under which there is good anchorage from N.W. winds. The S.E. part of this bank of reefs is about 2 m. from the N.W. part of the reefs off Ras Mahluk. Off Ras-ul-Khoormah the channel is 5 m. wide, decreasing again to $1\frac{1}{2}$ m., as Sherm Rhabuc is approached. There is a rocky shoal about mid-channel off Ras-ul-Koormah, but in all other parts no bottom at 40 and 50 fathoms.

Shoal. There is also a rocky patch about 2 m. to the S.E. of Sháb Nazer.

SHERM RHABUC, in lat. $22^{\circ} 42' N.$, and lon. $38^{\circ} 58\frac{1}{4}' E.$, is a capacious inlet, affording excellent anchorage inside its entrance in 8 to 12 fathoms, perfectly sheltered from all winds, and easy of ingress and egress when N.W. winds are blowing. This is a sacred spot to Mussalman pilgrims, who here disrobe and put on the white garb of pilgrims. At this point of Rhabuc, wood, water, and other supplies may be obtained at a cheap rate, but the Bedouin Arabs are not to be implicitly trusted. An extensive date grove and several villages are situated about 5 m. inland. In the interior of the country there is a range of mountains, of which the most conspicuous and nearest is a double bluff hill with precipitous sides, called **Jebel Rahab**: it is in lat. $22^{\circ} 32\frac{1}{4}' N.$, and lon. $39^{\circ} 23\frac{1}{4}' E.$

Shab-el-Abyad, or Abbeet Reef, (the E. end) bears W. from Sherm Rhabuc about 10 m.; it is a large reef about 8 m. in extent N.W. and S.E., with no bottom at 30 and 40 fathoms near it. At 9 m. W.N.W. from the N.W. end of this reef, are four small shoals lying close together, called **Shab Comsah**; they are in lat. $22^{\circ} 47' N.$, and lon. $38^{\circ} 35' E.$, and there is no bottom at 40 fathoms close to the E. of them. At 3 m. E. by N. from them is a rocky patch, equally steep-to.

The Coast from Sherm Rhabuc goes 15 m. N.W. by N. to **Sherm-ul-Kurrar**, and here again begins the coast-reef; and 8 m. further N.N.W. is a low sandy point called **Ras Mustoorah**. **Ras Delaidelah** is about 5 m. from **Ras Mustoorah** in the same direction, the coast between forming a bight, in which is an island on a reef, and many rocky patches; there is also a bight full of rocks to the N. of this **Ras**. From **Ras Delaidelah** 14 m. N.N.W. is **Ras-ul-Kheehum**, and 13 m. further in the same direction is a low sandy point called **Ras Abbiat**, the coast throughout the whole extent bordered by a coral reef, with shoal water and rocky patches, running off from 4 to 7 m. from shore, and no bottom at 30 fathoms close outside.

Khurarr Reefs. At 16 m. to the N. from **Shab Comsah** lies a small reef, in lat. $23^{\circ} 2\frac{1}{4}' N.$, on the W. side of a bank of soundings of 15 to 25 fathoms; this is the outer reef of a large cluster called **Guttah-ul-Khurarr**, the nearest part of which lies about 1 league off the coast at **Sherm-ul-Khurarr**. There are passages and anchorages among these reefs, also a safe channel near the shore, with no bottom at 30 and 40 fathoms. The outer boundary of the **Khurarr Reefs** lies 9 to 11 m. from the main land, which is low near the sea; they extend from lat. $22^{\circ} 48'$ to lat. $23^{\circ} 5\frac{1}{4}' N.$; their S. extreme lies 6 m. to E. by N. of **Shab Comsah**.

Sherm Barickhah, or Baraikah, lying about 5 m. N.N.W. from **Ras Abbiat**, is a small inlet, running nearly 3 m. inland E.N.E., at the head of which are the ruins of a fortified town. Here is good anchorage for small vessels, and stock is procurable, but the natives are not to be trusted; in fact, the whole tract of coast from **Ras Hartebah** to this place is inhabited by the **Hurrah Bedouins**, a tribe whose character is proverbial throughout the Red Sea for ferocity and treachery, so that it is dangerous to land upon it. N.W. 38 m. from **Sherm Barickhah** is the entrance to **Yembo**, the coast between bending in a little, and bordered throughout with a coral reef. At the distance of 6 m. from the former is **Ras Attiah**, and 8 m. further **Ras Madges, (Mahjis)** to the S. of which is good anchorage, in a bight of the coast-reef.

Reefs. N. from the outer **Khurarr Reef** are the numerous shore-reefs before mentioned; a N.N.W. line from the outer **Khurarr Reef** leads from 3 to 6 m. to the W. of these reefs, to lat. $23^{\circ} 27' N.$ and lon. $38^{\circ} 23' E.$, in which situation there is a small reef, the S. one of a group extending 18 m. to the N., to lat. $23^{\circ} 45' N.$; they have soundings and indifferent anchorage among them, but no soundings on their outside. Their inner edge is from 2 to 3 m. off the coast-reef, and their N.W. extremity extends to lon. $38^{\circ} 15' E.$, fully 11 m. W. by S. from **Ras Attiah**. About 3 m. W.S.W. from **Ras Abbiat** is an isolated reef with 7 fathoms by it, and no bottom at 40 and

50 fathoms near to it; this lies midway from Ras Abbiat towards the S.E. side of the group of reefs just described. About 17 m. to the W. of Ras Abbiat, in lat. $23^{\circ} 30' N.$, and lon. $38^{\circ} 13' E.$, is the S.E. end of a large reef called **Shab Sufiani**, extending thence 3 m. to N.N.W., having no bottom at 100 fathoms close to the S. Jebel Soubah bears from it E. by S. $\frac{1}{2}$ S., distant 46 m.

Jebel Soubah, in lat. $23^{\circ} 18' N.$, and lon. $39^{\circ} 3' E.$, is a remarkably high mountain near the sea, of 4,500 ft. elevation, and higher than any other hills between Jiddah and Yembo; it can be seen at the distance of 40 m. The upper part forms a convex line, with two small peaks near the centre. A range of very high land extends some distance to the N.N.E. of Soubah, and has several remarkable peaks on it; but these are seldom seen far at sea, unless the atmosphere is very clear.

Thetis Reef lies about N.W. by W. 13 m. from Shab Sufiani, and 27 m. to the S. of Yembo. The Thetis Reef, in lat. $23^{\circ} 38' N.$, and lon. $38^{\circ} 2' E.$, is a small and dangerous reef, having no bottom at 120 fathoms very near to it. This Reef was discovered in the Indian Navy's cruiser *Thetis*, in 1829. About 7 m. N. by W. from the Thetis Reef is the S.E. of a cluster of shoals called **Shab Subah**, or the Seven Reefs, in lat. $23^{\circ} 45' N.$; they thence extend about 9 m. N.W. by N. to lat. $23^{\circ} 53' N.$, and are about 2 m. wide, their W. boundary being in lon. $37^{\circ} 53' E.$ These are the most dangerous reefs on this part of the coast, as they lie so far from the land, and there is no bottom at 100 fathoms at a short distance to the W. of them. Besides these there are several reefs and rocky patches lying from 5 to 9 m. off shore, between Ras Mahjis and Yembo, with deep water between them. The outermost of these is in lat. $23^{\circ} 50' N.$, lon. $38^{\circ} 8' E.$ The N. one, called **Guprear** (Gabriya), is in lat. $24^{\circ} 2' N.$, lon. $37^{\circ} 57' E.$, and bears from Yembo entrance S.W. by W. $5\frac{1}{2}$ m.: there is good anchorage in N.W. winds at this reef. Four miles to the W. of Guprear is another small reef, and at W.N.W. $6\frac{1}{2}$ m. from Guprear, there is another reef with 7 fathoms near, and no bottom at 70 fathoms to the E. of it. Another small reef lies S. by W. about 8 m. from Yembo. These are the only dangers in approaching Yembo, and they are easily avoided; by a good look-out a vessel may stand close to them without fear.

YEMBO, the Port of Medina, is governed by a Turkish Effendi, and garrisoned by a few troops from Egypt. It is situate on a low sandy shore, and on the N. side of a capacious inlet of the sea. The entrance of the harbour lies in lat. $24^{\circ} 4' 30'' N.$, and lon. $38^{\circ} 2' E.$ The high houses and mosques can be seen 13 m. distant, and the approach to it is not dangerous; there are no soundings close to the entrance, which is 300 yards across, and a vessel can only enter with a fair wind. A patch of rocks bounds the S. side of the entrance, and extends a little distance to the N.W., on which the N.W. swell breaks very heavily, making the harbour difficult to quit when N.W. winds have been blowing; and the land-wind in the morning is scarcely sufficient to carry a vessel out against the swell. This endangers a vessel being drifted on the rocks, should the land-wind fail, and the boats be unable to tow the vessel against the swell. This was the case with the Indian Navy surveying brig *Palinurus*, and she narrowly escaped being wrecked. After entering the inlet it widens considerably, and forms a capacious harbour, with 4 to 6 fathoms in it. Yembo affords a good and cheap supply of excellent fresh water, which is kept in covered or vaulted tanks in and near the town; its price about 300 gallons for one dollar. Wood is scarce; sheep in abundance, at $1\frac{1}{2}$ dollars each; a few bullocks, fowls, fruit, and vegetables are to be obtained.

There is a conspicuous white tomb in the low sandy point forming the N. side of the harbour, and there is a small sandy island, covered with bushes, having a sheik's tomb near its E. end, on the broad bank of the reef forming the S. side. There is a remarkable range of high table-mountains to the N.E. of Yembo, called the **Radhwah Mountains**, which are by measurement 6,000 ft. high; the N.W. brow bears from Yembo N.N.E., distant 31 m.; the S.E. brow N.E. by N., $31\frac{1}{2}$ m.

The **Sugar Loaf and Scragged hill**, inland of Cape Bareedy, are the best land-marks.

Sherm Yembo, a capacious harbour and inlet of the sea, situated 8 m. to the N.W. from the port of Yembo; the entrance lies in lat. $24^{\circ} 9' N.$, and lon. $37^{\circ} 55' E.$ It is a safe and commodious harbour, being easy of ingress and egress for the largest ship. The soundings are from 20 fathoms at its entrance, decreasing to 10 and 8 fathoms a little way in, from whence it branches off in several arms, the N. one to the distance of 5 m. inland. The coast about Sherm Yembo is a low, sandy shore, and clear of dangers; but a reef (mentioned as lying $6\frac{1}{2}$ m. to W.N.W. from Guprear) bears S.S.W. $\frac{1}{2}$ W., distant $5\frac{1}{2}$ m. from the mouth of Sherm Yembo. The coast has a very narrow fringing reef, close to which there are deep soundings till near **Cape Bareedy**; off which, distant 8 m. to S.E., are several reefs, with anchorages and passages between them. Soundings from 13 to 25 fathoms extend to the S.E. of these reefs; the land opposite forms a deep bay. There are no soundings any distance to the W. of the reef off Bareedy, and none at Cape Bareedy, 100 yards from the narrow reef bounding the shore.

CAPE BAREEDY is a moderately elevated promontory, forming a convex curve to the W., about 7 m. in breadth. Several points form on this Cape, all having different names by the natives;

therefore we take the centre and most S. part of this promontory for Cape Bareedy, which lies in lat. $24^{\circ} 16' N.$ and lon. $37^{\circ} 32' E.$ The face of the shore is bounded by steep cliffs, and there are no soundings close to them. The dangers to the S.E. project for 7 or 8 m., as before described; there are none to the S.W. or W. Inland to the N. and N.E. of Cape Bareedy there is a remarkable range of broken hills, of moderate elevation; the N.W. one, called Sugar-loaf, bears from Bareedy N. $\frac{1}{2}$ E., distant 17 m.: the S.E. one, called Scragged Hill, bears from Bareedy about N.E. by N., distant $16\frac{1}{2}$ m.: these are very conspicuous hills when nearing the coast, and are seen under the high land to the N.E. of them, which range of mountains extends from Yembo towards Hasáni Island. In the centre of this high land is one more elevated and conspicuous than the rest, called Round Mountain; it is in lat. $24^{\circ} 43' N.$ and lon. $37^{\circ} 55' E.$; the N. part of the high land is nearly abreast of Hasáni Island.

Shab Groosh, or Shark Reef, is the first danger to the N. of Cape Bareedy; it is a small reef, bearing from Bareedy about N.W. by W., distant 18 m.; it lies 4 m. from the coast, and is the S. one of a group which extends 4 or 5 m. to the W. from the prominent point at 8 m. to the N.W. of Cape Bareedy; among this group there is indifferent anchorage. To the W.N.W. of Shab Groosh, and distant about $13\frac{1}{2}$ m., lie the **Palinurus Reefs**, called by the natives **Shab Shaybah**; these are a group of small reefs, of 4 or 5 m. in extent, having no soundings or anchorages near them. Being the outer reefs, and situated 14 or 15 m. from land, they are dangerous for a ship to approach in the night. The centre and W. one lies in lat. $24^{\circ} 26\frac{1}{2}' N.$, and lon. $37^{\circ} 6' E.$; from this the N. reef bears N. by W. $2\frac{1}{2}$ m., the S. one S.S.E. 3 m. On the S. end of the large reef, which lies to the E. 4 m., there is a rock above water, about the size of a ship's capstan. A good mark for these reefs is Scragged Hill on with the N. brow of the Radhwah Mountains. Bearing N. from the centre of the Palinurus Reefs, to the distance of $9\frac{1}{2}$ and $12\frac{1}{2}$ m., in lat. $24^{\circ} 38' N.$, are four small shoals, with sunken rocks close about them: there are no soundings to the W. of these reefs.

Aboo Matari Reefs. In lat. $24^{\circ} 44' N.$ and lon. $37^{\circ} 4' E.$ is the centre of a group of large and small reefs, extending 5 m. to the N.W. and S.E., on a bank of sunken rocks and soundings, about $1\frac{1}{2}$ m. broad; indifferent anchorage for a small vessel may be found under these reefs; they are named by the Arabs Aboomutarah, and lie 4 m. W. from the shore, off a point called Ras Mahar: there are no soundings to the W. of these reefs. To the S. of them, and separated by a channel about 2 m. wide, there is a cluster of reefs extending over an area of nearly 1 square league.

Sherm Mahar is a good anchorage, in a bay on the coast, E. by S. 6 m. from the S. end of Aboomutarah Reefs; this place is capable of affording shelter to any ship from N.W. winds; you anchor in 7 fathoms, sand. Moderately elevated table-hills approach close to the sea, a remarkable gap in them forming a deep valley, points out the anchorage, which lies in lat. $24^{\circ} 41' N.$, and lon. $37^{\circ} 16' E.$ Sheep are to be obtained from the Bedouins, but water is scarce. There is another anchorage on the coast, 4 m. to the S.E., called Sherm Hussay, but it is indifferent on account of its being so contracted, the depth of water great, and bottom foul.

Shab Mombarak is a small shoal, with anchorage on its S.E. side; it lies N. by W. distant 4 m. from the centre of the Aboomutarah Reefs; this is the outer danger, till approaching Hasáni Island, which lies N. from this, distant 12 m.

HASANI ISLAND, the centre or high part of which is in lat. $24^{\circ} 58' N.$, and lon. $37^{\circ} 4' E.$, is 4 m. in length, N.W. and S.E., and about 2 m. broad; the Island is 700 ft. high at the centre and N. end, but slopes gradually down to a low point on its S., and it can be seen from the deck of a ship 25 m. in clear weather. It lies 10 m. from the coast, which here forms a deep bay to the E., in which are several reefs and two small islands. Ras Abou-Mood, a low, sandy, but very projecting point of the coast, lies 7 m. to the S.S.E. of Hasáni. There is spacious anchorage near the S.E. part of the Island, in 10 or 15 fathoms; but care must be observed not to haul too close round the S.W. side, as there is an extensive reef and sunken rocks, running off from the S.W. point to the S.E., to the distance of $1\frac{1}{2}$ m. The best anchorage is round the S.E. point, close to a large Arab village, which is inhabited some months in the year by people from the main land. The anchorage abreast the village affords shelter from all winds. A scanty supply of sheep, wood, and water can be obtained from the natives, who bring it from the maiu, which is here rich in pastures and dates; but caution ought to be observed in transactions with the natives.

Small reefs. Bearing about S.W. by W., distant $6\frac{1}{2}$ m. from the centre of Hasáni Island, is a small reef, having no soundings near it. Another small reef lies off at 6 m. due W. from the N. point of Hasáni; these are the outer reefs from the island; others lie to the E., between the latter reef and the island, where anchorage may be had.

Libnah, a small rocky island of 300 ft. elevation, stands $\frac{1}{2}$ m. distant from the N.W. end of Hasáni, having a channel between it and the latter, only to be used by boats. To the N.W. of

Hasāni, distant 4 m., a long reef is connected with the N. end of the Island. This extensive reef reaches in broken patches, rocks, and sand-banks, to the distance of 15 m. to the N.N.E., having narrow and dangerous channels between them.

Mushabih Reefs. A line, about N.W. $\frac{1}{2}$ N., from the centre of Hasāni to lat. $25^{\circ} 23\frac{1}{2}'$ N., reaches the S. end of the reef, which extends 14 m. to the S.E. of the low coral island of Mushabih; this line just touches the W. boundary of other reefs, consisting of several small but dangerous reefs, situated between Hasāni and the long reef off Mushabih. Inside of these reefs a ship ought on no account to venture: they have no soundings near them, and lie 15 m. from the coast, which, in this part, is pointed by numerous coral islands and reefs. In lat. $25^{\circ} 24'$ N. and lon. $36^{\circ} 39'$ E., is the S. end of the extensive reef connected with Mushabih Island: it lies S.E. by S., distant 14 m. from the S. point of the island, forming a concave curve to the E.: there are no dangers or soundings to the W. of the reef.

Shaybarah Island, which bears E., 9 m. from the point of this reef, is a low, sandy, and coral island, having numerous bushes on it: the length of it from N.W. to S.E. is about 6 m. and 3 m. broad. Between this island and the S. point of the reef just mentioned is a broad channel, which leads into a gap among the inner reefs: from thence among the reefs to the N. This channel is used by all the native boats, but is much too narrow and dangerous for a ship, although the surveying brig *Palinurus* passed through it twice. There is good anchorage throughout this channel. **Woghadi Island** stands 1 league to the S.E. of Shaybarah, and there is good anchorage to the E. of it in 7 to 10 fathoms, protected from N.W. winds; this anchorage is 6 m. off the main land.

MUSHABIH ISLAND (the N.W. end, in lat. $25^{\circ} 40'$ N., and lon. $36^{\circ} 27'$ E.), is a low and level coral island, from 18 to 20 ft. high, $4\frac{1}{2}$ m. in length, N.W. and S.E., and $1\frac{1}{2}$ m. broad; its W. side is quite steep, with coral cliffs, having no soundings at 120 fathoms, close to the cliffs: there are no dangers to the W. of it. The reef extending off the S. end has a gap in it, distant about 2 m. from the island. In this gap of the reef a vessel may anchor, but the bottom is very foul. Mushabih stands out towards the centre of the sea, about 16 m. from the line of coast; and 51 m. to the N.E. of the Light on Dædalus shoal.

Sheikh Murbut, in lat. $25^{\circ} 53\frac{1}{2}'$ N., a low, coral island, with excellent anchorage close to the S. of it, is the N. isle of this group; it contains the remains of a Mussulman saint of that name, deposited in a now ruinous tomb. This island or anchorage is safe to approach: a bank of soundings, from 50 to 80 fathoms, extends to the W. of it 5 or 6 m., as well as 12 and 13 m. to the N.N.W., joining the rocky or broken-cliff island of Murdoonah.

Cape Ghurkoomah (Ras Kurkoomah) is the nearest point of the main land, situated 4 or 5 m. E. by S. from Sheikh Murbut; it is 400 ft. high, and the Cape gradually rises in the centre. To the N. of Sheikh Murbut and Kurkoomah, a deep bay extends to the N. for 11 m. to the little bay of **Sherm Manaiboora**; in the centre of this deep bay there is a large reef, and soundings all about it from 25 to 10 fathoms.

Murdoonah Island is about 150 or 200 ft. high, in broken coral cliffs; it is about $\frac{3}{4}$ m. long, N.N.W. and S.S.E., in some places only 100 or 50 ft. wide; it lies in lat. $26^{\circ} 4'$ N., and lon. $36^{\circ} 27\frac{1}{2}'$ E., or about 24 m. due N. from Mushabih. A bank of sandy soundings extends to the S.S.W. of the island, 7 m., but not far to the W. Anchorage close to a reef off its S. end affords shelter from N.W. winds; but better anchorage is obtained by proceeding to the main land, which lies 5 m. to the E., forming a point; close to the N. of which is **Sherm Abban**, a fine bay and good anchorage. The land from this point runs to the E., 4 or 5 m., and affords good shelter and anchorage from N.W. winds; the soundings are from 30 to 15 fathoms near the shore, which is low and sandy; the beach in some parts is pointed by low coral cliffs. Excellent water and sheep in plenty, also fire wood, may be obtained at Sherms Abban and Manaiboora; the Bedouin Arabs supply the articles at a cheap rate; water at about 200 gallons for a dollar; sheep are one and one and a half dollars each. There is a safe passage between Murdoonah Island and the main, which leads up to the port and harbour of Wedgi, or El-Weijh. N.W. from Murdoonah, distant 9 m., is the island of **Riackah (Raikah)**; this island rises gradually from its S. end to about 50 ft., in the middle and N. end. An extensive reef and patches extend to the S., to within 2 m. of Murdoonah Island. There are no dangers to the N.W. of Riackah Island, which is safe to approach, should a ship wish to get into the port of Weijh.

SHERM WEDGI, or the port of El-Weijh, is a small bay on the coast, capable of affording good anchorage in $3\frac{1}{2}$ to 6 fathoms, for a small or middle-sized ship: the bay forms three sides of a square; the entrance 250 yards broad. A ship ought to anchor close inside the N. point, as the water is shoaler a little way up the bay: she will then be just clear of the N.W. swell, which rolls across the entrance; the ground is stiff clay. This place is easy of ingress and egress, and no dangers lie out to seaward: the island of Riackah lying to the W.S.W. $5\frac{1}{2}$ m., may be boldly ap-

proached along its N. side, and it will lead a ship into Wedgi. The coast about Wedgi is coral cliffs, about 50 to 70 ft. high; the port is not easily distinguished till close to it. It lies in lat. $26^{\circ} 13' N.$, and lon. $36^{\circ} 26' E.$ Wedgi affords a good and cheap supply of excellent water, obtained from the Bedouins, who charge one-twentieth part of a dollar for two skins, containing about 5 gallons each skin, or about 200 gallons per dollar. They can supply 2,000 gallons a day, brought from some wells distant 6 m. inland, where there is a Turkish garrison of twenty-five men, in a small fort used as a depôt for grain, required by the caravans going to Mecca. Sheep may be obtained at one or one and a half dollars a head. Should a large ship require water at Wedgi, and not like the anchorage, she may anchor to the S. of the reef extending or connected with the S. end of Riackah Island, distant 4 or 5 m. from Wedgi, at which place boats can be procured to bring water. The Arabs at Wedgi are civil, and were under the chief of the Billy tribe, named Sheikh Amarah; the Sheikh generally resides near Wedgi, and expects a small present. A number of fishermen also reside here, belonging to that extraordinary race, the Hootaimy, so well described in Lieutenant Welsted's narrative of these seas, who are half Bedouin, half fishermen, and found in small parties all over the Red Sea. To the N. of Wedgi, distant $20\frac{1}{2}$ m., or in lat. $26^{\circ} 34' N.$, and lon. $36^{\circ} 27' E.$, is a conspicuous mountain, called **Jebel Antar**, or **Jebel Leban**, having on its centre two small peaks, whose summits are 3,783 ft. above the level of the sea. This mountain is 8 m. from the sea coast, and can be easily and frequently distinguished at sea.

Riackah, or Raikah, Island, the centre of which lies in lat. $26^{\circ} 10' N.$ and lon. $36^{\circ} 20' E.$, is W.S.W., $5\frac{1}{2}$ m. from Wedgi. A line drawn from this, N.W. by N., to lat. $26^{\circ} 57' N.$, clears the W. or outer boundary of several patches of reefs, lying in groups, and extending from 5 to 8 m. from the main land, with channels and anchorages among them. No vessel ought to venture inside this imaginary line, which runs close to the reefs, unless she may require to anchor, which few navigators, not accustomed to anchor among reefs and sunken rocks, would be bold enough to do, unless they had a native pilot on board. The coast, 11 m. to the N.W. of Wedgi, is clear of reefs. Two small, low, sandy islands, covered with bushes, lie on some of the reefs to the W.: the S. one, **Ahwhendear Island (Uwaindiya)** is in lat. $26^{\circ} 36' N.$, and lon. $36^{\circ} 6' E.$; the N. one, **Naboogier Island (Nabagiya)** in lat. $26^{\circ} 43\frac{1}{4}' N.$, and lon. $36^{\circ} 1' E.$ The N. shoal of the group (**Shab Masahwig**) lies, as mentioned before, in lat. $26^{\circ} 57' N.$, lon. $35^{\circ} 46' E.$, and due S. 8 m. from the S. end of Namahn Island. Between this shoal and the island the coast is clear, and soundings extend a mile off shore, where a ship in moderate weather may anchor. From Wedgi to Namahn Island the coast has several small indentations, and a number of low hills extend close down to the coral cliffs which line the shore. There are two small bays, called **Sherm Antar** and **Sherm Demerah**, to the E. and E.N.E. of Ahwhendear Island, distant $6\frac{1}{2}$ m. **Sherm Demerah**, the N. one, is the best anchorage. At Mersa Zebaida, about 14 m. to E.S.E. of Shab Masahwig, there is good shelter, but the water is rather deep for anchoring; fire-wood is plentiful. The channel to it is along the N. side of the Shab Masahwig.

NAMAHN ISLAND is $3\frac{1}{2}$ m. long, N.N.W. and S.S.E., and 1 m. broad; it is low and sandy at the N. end, rising gradually to the S. end to about 400 ft. in broken and abrupt lime-stone cliffs and hills. The S. end lies in lat. $27^{\circ} 4' N.$, and lon. $35^{\circ} 45' E.$, and is distant from Ras Abou Musahrib on the main land about $1\frac{1}{2}$ m., forming a safe channel, and affording two safe anchorages, in 6 or 7 fathoms on the E. side of the island, in small bays; one to the N. and the other near its centre. Abreast the S. end of the island there is also anchorage near the main land, in 6 and 7 fathoms, under a low, woody point; the latter is most convenient for ships taking shelter from strong N.W. winds. A long reef joins and extends from the N.W. end of the island $4\frac{1}{2}$ m.; there are no soundings near it. The natives on the main land are civil, and bring sheep and water; but Europeans ought to be cautious not to go far inland.

Shoals and Channels. From the S. end of Namahn Island, a line drawn N.W. by N. to Ioubah Island (Yoobah), in lat. $27^{\circ} 45\frac{1}{2}' N.$, clears the outer boundary of the reefs off shore. The first group lies between lat. $27^{\circ} 15' N.$ and $27^{\circ} 18' N.$, and $1\frac{1}{2}$ m. to the E. of the above-named N.W. line, or at 4 m. to the S.W. of Sherm Jibbah; the second group lies between $27^{\circ} 25\frac{1}{2}' N.$ and $27^{\circ} 34' N.$, and from 2 to 5 m. E. of the line, or about one league off Ras Maharsh. The next group is about 6 m. in extent, N.W. and S.E., and very narrow, in which lie several low, coral islands, called the **Sillah Islands**; they are between the parallels of lat. $27^{\circ} 37' N.$ and $27^{\circ} 42' N.$, lying from 10 m. to 12 m. to the W. of Moilah. Between these shoals and also between them and the shore, the channels are clear; but a ship would do well not to go in-shore of them, as there is no bottom near the coast, and the reefs have no soundings close to their W. sides, though with light winds a vessel might anchor among them, with the exception of the Sillah Islands and Reefs.

Sherm Jibber, or Jibah, an inlet, in lat. $27^{\circ} 33' N.$, and lon. $35^{\circ} 32\frac{1}{2}' E.$, affords good anchorage, but the entrance is narrow. E. by S. $\frac{1}{2}$ S. from the fort of Moilah, is a remarkable sharp-pointed

hill, called Moilah High Peak, in lat. $27^{\circ} 37' N.$ and lon. $35^{\circ} 46' E.$, 6,330 ft. high (marked 9,000 ft. on the chart, which gives Moilah Sharp Peak, one league to the N.W., an elevation of 6,330 ft.); it has a very grotesque appearance, and is at the S.E. extreme of an immense range of high mountains, extending to the N. The mountains hereabouts approach nearer the sea than in general, and the land between them affords plenty of fire-wood, and grazing for sheep.

MOILAH, bearing N.N.W., 35 m. from Namahn Island, and E. about 12 m. from Sillah Islands, is a village and small fortress, which lies in lat. $27^{\circ} 40' N.$, and lon. $35^{\circ} 28' E.$; this is another station as a dépôt for grain for Mussulmen pilgrims. A small garrison of Turkish soldiers protects the place. A Bedouin chief being the nominal proprietor of this place, supplies are only to be obtained from him, and his men are not to be trusted. The place affords excellent water and sheep, but the anchorage is unfit either for ships or boats; besides, there are numerous dangers between it and the Sillah Islands. Should a vessel require water, supplies, or shelter, &c., she can run into an inlet called **Sherm Yarhour**, 4 m. to the S.E. of Moilah; though the entrance is narrow there is room enough inside, and it is beautifully sheltered; the approach to it from the W. is open between Sillah Islands and the second group of reefs before mentioned, and over a bank of soundings which has from 24 to 12 and 10 fathoms on it, with deep water between it and the main. At Yarhour the Bedouins bring fire-wood, water, and sheep, at a moderate price.

IOUBAH or **YOOBAB ISLAND**, the N. end in lat. $27^{\circ} 46' N.$, and lon. $35^{\circ} 7\frac{1}{2}' E.$, about 7 m. to the N.W. of the Sillah Islands, is $1\frac{1}{2}$ m. in length, N.W. and S.E., the N. end being a precipitous cliff 300 or 400 ft. high, sloping gradually to the S.E. end. There are no soundings or anchorage near this island. Two low, small, coral islands lie to the E. of Yoobah from 3 to 2 m.; a small reef also, 1 m. S.E. from the S. end of Ioubah; another N.N.W. $2\frac{1}{2}$ m. from the N. end of the island, having no soundings near them. To the N. of Yoobah about 17 m., the Arabian coast has a bay, called Ainoona or Eynounah, with the ruins of a town and aqueduct, but the entrance to the bay is so studded with reefs that only boats could enter. **Jebel Eynounah**, a mountain 6,090 ft. high (visible from the Gulf of Ahkaba), stands 14 m. to the N. by E. of the town. A lofty range, between 6,000 and 7,000 ft. high, stands between this and Moilah Peaks. The coast is fronted by numerous reefs, unfit for anchorage, bounding the coast; and to the S. of it lie in succession from the E. the islands of Burrahghan, Shooshooah, Senaffer, and Tirahn. **Shab Falham** is a reef, midway between Yoobah and Baraghán.

Baraghán, or **Burrahghan**, the S. end, in lat. $27^{\circ} 52' N.$, and lon. $35^{\circ} 3\frac{1}{2}' E.$, lies N.N.W., distant $6\frac{1}{2}$ m. from the N. end of Yoobah. It is $1\frac{1}{2}$ m. long, greatly indented, with small bays in broken coral cliffs or hills, about 100 ft. high. There is good anchorage on sandy bottom close to the S.E. end of the island, well sheltered from N.W. winds. Off the N.W. end there are some patches of sunken rocks, but the W. and S. sides are safe to approach. W. by N., 9 m. from Buraghán, lies the island of **Shooshooah**, a small island shaped like a quoin, being about 200 ft. high, forming a precipitous cliff on the S. face, close to which there are no soundings; but on the E. side of the island a small reef projects out, off which soundings extend a short distance, on which a vessel, upon an emergency, may anchor in 7 or 8 fathoms, on rocky and sandy ground. **Senaffer** (**Senafir**) is the next island to the W. This is rather a large island, of a semicircular form, having a fine khor or inlet on its S. side, in which there is excellent anchorage in 7 or 8 fathoms, sandy bottom; the anchorage is open to Southerly winds. Soundings of 15 and 25 fathoms extend to the S. of the island. Numerous broken peaked lime-stone hills cover the E. part of the island; the highest one, on its S.E. end, lies in lat. $27^{\circ} 54\frac{1}{2}' N.$, and lon. $34^{\circ} 48\frac{1}{2}' E.$

At 9 m. to the N.N.E. of the centre of Senafir, there is the narrow and shallow opening into one of those deep, natural harbours (*khors*), so numerous in the Red Sea, some of which may at no very remote day be gangways of Arabian commerce.

TIRAHN, the largest island in this part of the Sea, is 7 or 8 m. in extent; on its S. part, near the centre, is a high peak, about 700 ft. high, which lies in lat. $27^{\circ} 55' N.$, and lon. $34^{\circ} 34' E.$ The E. end of Tirahn, and the W. end of Senafir, are 2 m. distant; between which there is a passage; but there is a small shoal in the centre. Close off the S. and W. sides of Tirahn are no soundings. The W. side is distant from the peninsula of Sinai 4 m., but the passage into the sea off Akabah is only 1 m. broad, as the reefs from Tirahn extend nearly across to those off **Ras-el-Nasrani** on the main land, leaving a narrow and deep channel, with no bottom at 80 fathoms, called the **Strait of Tirahn**, through which the wind and swell come down with great violence.

Sherms Sheikh and **El-Moyah**. From Tirahn Peak, W. by S. $\frac{1}{4}$ S., distant 14 m., on the peninsula of Sinai, are two small bays, lying close together, affording indifferent anchorages for ships. The N. one, called **Sherm el Moyah**, from having a well of water (*moya*) near the beach, is the best anchorage. The entrance is narrow, and nearly blocked up with rocks, close to which, just at the entrance of the bay, a vessel may anchor in 6 or 7 fathoms in safety; and should it blow from the

S., she may warp into the bay, passing the rocks, when she will be completely land-locked, and in 6 or 7 fathoms. The water at the well is a little brackish, but would answer for stock or cooking. The other bay, called **Sherm Sheikh** (from having the tomb of a Sheikh on the beach), is more capacious, and entrance larger; but the water being so deep bottom cannot be found at 40 and 50 fathoms, till you are within 300 yards from the beach in the bay, when there are from 15 and 8 fathoms, sandy bottom. The coast outside these bays is a precipitous cliff, having no soundings near the shore. From these harbours the Bedouin Arabs of **Toor** are always on the look-out, eager and happy to convey letters or passengers from here to Suez or Cairo. They are civil and attentive, and may be freely trusted: in four days they take letters to Suez. Between these harbours and Ras Mohamed, distant 8 or 9 m. to the S.S.W., there is no anchorage on the coast; the hills come close to the sea, and present a grand range of mountains, extending to the N.N.E. and N.N.W., from 8,000 to 9,000 ft. high.

The Strait of Tirahn is not the only opening of the Gulf of Ahkaba. There is another between this island and Ras Furtak, through which steamers might conveniently pass into the Gulf, when the N.E. winds blow strong down it, causing a lee current through the Strait. To the N.E. of Ras Mohamed, off the Sherms Sheik and El Moyah, the flood tide sets to the N.E., and the ebb to S.W., influenced a great deal by prevailing winds. Here also the winds meet, when it is blowing hard from the N.N.W. out of the Gulf of Suez, and N.N.E. out of the Gulf of Akabah, coming in gusts, and changing in a few seconds, from both quarters. Still a vessel, with a little perseverance, can easily get to anchor, keeping well to windward, and then running along shore.

GULF, OR SEA, OF AKABAH, OR AHKABA.

This part of the Red Sea, so little known formerly, has now been found to afford no advantage for a sailing-ship: the advantages which might offer for steamers, in landing their packets at Akabah, are in a measure counteracted by the almost constant and violent Northerly winds which prevail here. These winds are increased in violence by a very high range of mountains bounding close both sides of the Sea, and opening like a funnel to the N. into Syria; from which cause the cooler atmosphere of the northern regions is drawn into this part with such violence, that it raises the sea into a deep and turbulent swell, so that no vessel could make way against it; the place also is void of soundings and anchorages, except one or two spots. No native vessels ever navigate this Sea; and such a dread have they of this place, that in crossing the Red Sea, near the Sea of Akabah, the Arabs always offer up a prayer for their safety. Numerous vessels have been lost hereabouts, and four attempts were made before the *Palinurus* succeeded in surveying it, having been blown away three different times: once while at anchor, having two bowers down, with 50 fathoms of chain on each.

The Strait of Tirahn. The entrance of the Sea of Akabah is nearly shut up by the island of Tirahn, and the extensive reefs connected with, and extending to, the E. and W. of this island, leaving one small channel to the W. of Tirahn, one mile broad, and no soundings at 80 fathoms in it, called the Strait of Tirahn; and one to the N.E. of the island, $\frac{1}{4}$ m. broad. This last is the best and safest channel, having anchorage throughout, which leads up to Ras Furtak, the E. point of entrance to the Sea of Akabah. The best passage inwards is along the E. and N. sides of Senafir island, then a N.W. course towards Furtak, passing about 1 m. off the sandy cape to S.E. of it. Under Ras Furtak point there is good anchorage, and here a vessel may remain till the winds allow her to proceed up the Gulf. At this point, between Ras Furtak and the Sinai coast, it is 7 m. broad, in lat. $28^{\circ} 6' N.$; the Sea then widens considerably, and the first anchorage is on the E. shore, in a snug cove, with a narrow entrance, between 6 and 7 m. from the Ras: this anchorage is called **Sherm Mujowah**. Five miles further, good anchorage will be found in **Sherm Dubher**. From this there is no anchorage on the E. side till at **Beer-al-Mashiya**, in lat. $28^{\circ} 51' N.$, which is about 10 m. N. of a bluff headland. A high mountain, called **Tybut Isrum**, bounds the view on the E. side, when seen from the lower and upper part of the Gulf; from Mashiya it bears about E.S.E.

DAHAB, or MERSA DAHAB (i.e. the Golden Port), probably the **Eziongeber** mentioned in Scripture, is on the W. side, or peninsula of Sinai, in lat. $28^{\circ} 28' N.$, and lon. $34^{\circ} 33' E.$, and bearing N., distant 33 m. from the Peak on Tirahn Island, and nearly E. 29 m. direct from Mount Sinai. This point is formed by a sandy point, extending out from the line of coast nearly 2 m., on the outer extreme of which is a large date-grove: among the trees indifferent water is found in some wells. Near the date-trees is a small bay or anchorage, affording shelter enough for boats. It is named Minna; but the anchorage for ships is on the S. part of the cape, where the sandy point forms a horse shoe shape to the W. In this bay a vessel may anchor in 6 or 7 fathoms, perfectly sheltered from all winds. The date-grove at Dahab is inhabited during the fruit-season; but

the Toorwarree Arabs return before the winter months for pasture in the valleys of the immense mountains, in the dreary peninsula of Sinai. Jebel Aboo Reesh stands about one league to the N.W. of Dahab, and Jebel-el-Arabi is to the S.W. The Wadi Nusb is between them. The sandy points are all formed by the torrents, which at times wash out the sand from some of the larger valleys. The next anchorage is on the same side, about $7\frac{1}{2}$ m. to the N.N.E. of Dahab, under the lee of a sandy point, called **Ras Methna**, of which Ras Ahsir is the N. point.

Jebel Aboo Ma, in lat. $28^{\circ} 43' N.$, is a prominent, bluff cape, with very deep water off it, called Windy Cape by the surveyors, but there is no anchorage there. Nearly N. of this Cape, 7 m., is Warsut, a low, sandy point, in lat. $28^{\circ} 50' N.$; here is good anchorage from N. winds. To the E. from Warsut, on the opposite shore, distant 9 m., is an anchorage under a sandy point, called **Beer-al-Mashiya**, in lat. $28^{\circ} 51' N.$: a small patch of rocks surrounds this point, and extends a little to seaward, having deep soundings 1 m. off shore; there is good anchorage under this Cape in 5 or 6 fathoms, well protected from N. winds. **Noweeby**, or **El-Noweyba**, a low, sandy point, on the Sinai side, off a wadi, or valley, with a large grove of date-trees on it, is 7 m. to the N. of Warsut, and about 10 m. to the N.W. of Beer-al-Mashiya; it is in lat. $28^{\circ} 56\frac{1}{2}' N.$: this spot affords good shelter from N. winds, and indifferent water may be obtained among the date-trees, where there are some wells.

Aboo Rumlal, the N. point of a small bay, about 13 m. above Noweeby, on the same side; this is the next anchorage, and is sheltered from N. winds. It lies in lat. $29^{\circ} 8' N.$, and will be known by having a white patch or land-drift on the lower hills, $2\frac{1}{2}$ m. to the N.N.E. of the cape.

Between this cape, or white patch, and the island called **Jezirat Faroun**, or Pharaoh Island, near the head of the Sea, there are three different anchorages from N.E. winds on the Sinai side: the first is N. of White Cape, 2 m.; the next N. a little E., $7\frac{1}{2}$ m. from White Cape; the third N.N.E., about $11\frac{1}{2}$ m.; all in small bays. The distance from White Cape to the opposite shore is 9 m., where there is a small bay with an island in the centre of it, called **Omaider Island**. There is good anchorage between the island and the main, and sheep are here to be procured; but, like all other anchorages, excepting Dahab and Mujowah Cove, it is exposed to the Southerly winds, which sometimes, in the winter months, change suddenly, and blow violently for a day or a few hours.

Jezirat Faroun, or **Pharaoh Island**, about $\frac{1}{2}$ m. long, and 300 or 400 yards broad, lies in lat. $29^{\circ} 24\frac{1}{2}' N.$, and from the fort or village of Akabah bears W.S.W., distant about 8 m. The island of Faroun is a barren rock, surrounded by an old Saracenic castle, now in ruins. In this castle are the remains of capacious water-tanks, all out of repair; this fortification occupies the whole of the top of the island, and has once been a strong place: it is situated about 400 yards from the main land, between which and the island there is good anchorage in 10 fathoms, sand and rocks. The Arabs at Akabah will bring supplies to this place in five or six hours, but they are not to be trusted.

AKABAH, or **AHKABA**, is a small Arab village, in an extensive date-grove, nearly at the head of the Gulf, and on the E. shore; close to the village there is a small, square fort, garrisoned by twenty-five Turkish soldiers from Egypt; this is a depôt for grain, used by the caravans on their way to, and return from, Mecca. The fort is in lat. $29^{\circ} 28\frac{1}{2}' N.$, and lon. $35^{\circ} 1' E.$ Near the fort and adjacent country are numerous ruins, which we had not an opportunity of examining. From the fort of Akabah the head of this Sea forms a circular bay, 3 m. to the N. and N.N.W., and the same distance across; but abreast of Faroun Island it is nearly 7 m. broad. The coast at the head of the Sea is very low, being a sandy valley, called Wadi el Araba, bounded on each side by high mountains. At the head of the Sea there is good anchorage from Northerly winds, and fresh water may easily be obtained by digging a few feet close to the beach; in anchoring at this place, it must be recollected that Southerly winds bring up a heavy swell.

The Navigation of the Gulf of Suez, and of the Red Sea generally, together with the meaning of Arab words, are described at the end of Chapter VIII.

CHAPTER X.

ARABIAN COAST—RED SEA TO MASKAT.

ADEN—SHUGRA—HISN GHORAB—RAS REHMAT—MAKALLEH—KOSAIR—MISENAHT—PALINURUS SHOAL
—SIHOOT—CAPE FARTAK—MERBAT—KOORIA MOORIA ISLANDS—RAS MADRAKA—GULF OF MASEERA
—GUBET HASHEESH—MASEERA ISLAND—RAS-EL-HADD—SOOR—MASKAT—WINDS AND WEATHER
—POPULATION—TRADE—NAVIGATION.

(VARIATION AT ADEN, $3\frac{1}{2}^{\circ}$ W.; AT MAKALLEH, $2\frac{1}{2}^{\circ}$ W.; AT KOORIA MOORIA BAY, $1\frac{1}{2}^{\circ}$ W.; AT RAS-EL-HADD AND MASKAT, 1° W.)

Cape Bab-el-Mandeb, on the N.E. side of the entrance to the Red Sea, is a prominent head-land, with low land behind it, giving it, when first seen from the offing, the appearance of an island. It has numerous rocky points forming small bays, some of which afford shelter for small vessels, and in which the boats from the opposite side land sheep for the Mocha market. Quoin Hill (Jebel Manhali,) which forms the high land of the cape, slopes towards the sea, and is about 865 ft. high; rendering it generally visible from a ship's deck at the distance of 35 m.; always having the appearance of a quoin. The rock composing this mountain was found by Captain Haines to be highly magnetic, causing his theodolite needle to vary 13° from the magnetic meridian. Inland to the N.E. about 15 m. is a range of hills called Jebel Hejáf, and immediately beyond them the longer range of Jebel Ahrah, known as the Chimney Peaks, from their irregular and peaked outline. These ranges run in a N.W. and S.E. direction, and are fronted towards the sea by low land. This low land not being discernible at a great distance, causes the inland mountains to be sometimes mistaken for Cape Bab-el-Mandeb. The S.E. end of this Ahrah range terminates in a barn-like mountain, with a peak in its centre, called Barn Peak. Between Ras Bab-el-Mandeb and Ras Ahrah, which is 9 leagues farther E., is a large bay, called **Gubet Heikah**, with low and sandy shores. The depths in the outer part of the bay are from 14 to 20 fathoms, decreasing towards the shore. A ship standing into this bay should not shoal her water to less than 10 fathoms by day, or 14 by night, in order to avoid the 3 and $3\frac{1}{2}$ -fathom knolls which are outside the reef, distant about a mile from the shore. Ships working into the straits during the strong N.W. winds of June and July, will find convenient shelter in this bay, under the E. side of Cape Bab-el-Mandeb; for, although gusts may come off the land, the water will remain smooth. The bank of soundings extends about 12 or 14 m. off this part of the coast. Water may be obtained here, from a well 2 m. to the E. of the Sekéya date-trees, which stand near the shore 6 m. E.N.E. of the E. point of Cape Bab-el-Mandeb. Fire-wood was found by Captain Haines in large quantities strewed along the beach.

Ras Ara, or Ahrah, in lat. $12^{\circ} 37\frac{1}{2}'$ N., lon. $43^{\circ} 53\frac{1}{2}'$ E., the extreme S. point of Arabia, is very low and sandy, and much rounded, having no distinct point. There is a shoal bank running off the shore to the S. and E., which, being in the direct route of vessels proceeding to and from the Red Sea, renders this one of the most dangerous capes on the coast; several vessels have been wrecked near it. There is safe anchorage, with E. winds, to the W. of the cape, in from 6 to 12 fathoms. The coast to the E. of Ras Ara continues low and sandy to Khor Amran, 13 m. distant, and is fronted by the bank already mentioned, which extends from 2 to $3\frac{1}{2}$ m. off shore, suddenly shoaling on its outer edge from 15 fathoms, and having many dangerous knolls, from 6 to 18 ft.

Khor Amran is a basin-like inlet, of 3 or 4 m. in extent, having a depth inside from 3 to 6 fathoms; but its entrance, which is on its W. side, is both shallow and intricate. This basin is formed by a narrow strip of land, so low as to be nearly covered at L. W. spring-tides. Immediately behind Khor Amran is the high land of St. Anthony (Jebel Kuruz,) rising to an elevation of 2,772 ft. Seven or eight miles farther to the E., the saddle hill, called Jebel Ghow, or Kau, rises to 798 ft., with several small hills near it; and about 3 m. to S.S.E., the black cape, Ras Ghow. The coast between Khor Amran and Ras Ghow, like the coast before described, is fronted by a sand-bank, extending in some parts about 3 m. off the shore; and although the limits of the bank may sometimes be seen from a ship's mast-head, much caution is always necessary in approaching this part of the coast, as the water shoals very suddenly. Ras Ghow is in lat. $12^{\circ} 40'$ N., lon. $44^{\circ} 26'$ E.

The coast from Ras Ghow to Ras Amran forms **Amran Bay**, and is low and sandy, interspersed with a few bushy shrubs, which is the character of the country for many miles inland. The soundings in this bay are tolerably regular, with a depth of 12 and 13 fathoms 2 or 3 m. off the shore. The bottom is principally clay and sand, but in some parts clay and shells, with occasional rocky patches. There is excellent shelter in this bay, Bunder Amran, from E. winds under Ras Amran, which cape forms the E. termination of the territory of the Subeihi tribe, numbering about 12,000 persons. Captain Haines, who had considerable intercourse with the inhabitants of this district, speaks of them as being of a naturally kind and friendly disposition, but that the cruel and treacherous treatment they receive from their hostile neighbours has made them suspicious and revengeful. They profess the Mahomedan religion, and are governed by two principal chiefs or sultans, who exercise an unlimited authority.

Ras Amran, in lat. $12^{\circ} 43\frac{1}{2}'$ N., lon. $44^{\circ} 42'$ E., is a small rocky island, fronted on its W. side by rocks, and separated from the peninsula of the main land by a narrow, rocky channel. The land forming the peninsula has an elevation of 700 ft., and there are two coves formed by rocky peninsular points on its E. side: the E. of these points is the peak called Jezirat Abou Summa. In-shore of the low, sandy isthmus, there are a few fishermen's huts, and the tomb of Sheik Sumrah. The bay between Ras Amran and Jebel Hasan is called **Bunder Fuggum (Feikam)**, and contains a small island (Jezirat-el-Juhoob,) nearly mid-way between its extreme points. There is also a rock, generally above water, about 800 yards to E.S.E. of that island, with a 5-fathom channel between them. The soundings in the bay are regular, and vary from 8 to 7 or 8 fathoms, with sandy and muddy bottom. The land is a low, swampy tract of sand-hills, giving at H. W. each of the high capes the appearance of an island.

Jebel Hasan is a mountainous peninsula, separating the bays Bunder Feikam and Aden Bay. The highest part, which is near the centre, has an elevation of 1,237 ft., and there is a double peaked hill, known by the name of Asses' Ears, near its E. bluff point. This peninsula has six principal projecting points, the most S. of which, Ras Majellub Haidee, is in lat. $12^{\circ} 43'$ N., lon. $44^{\circ} 52'$ E. On the S.E. side of this peninsula there are nine rocky islets, nearly joining the main land at low spring-tides. One is in the small bay (Bunder Sheik) to the E. of Ras Majellub Haidee; two more in the entrance of the next bay, Khor Gadeer; another off the N.E. point (Ras Saleel) of this bay, and five off the E. bluff of the peninsula, within a mile of the land. On the W. side of Khor Gadeer there is a white tomb, near which the Ahkrabi deposit coffee, cotton, and a few other articles of merchandise for the small trading boats which resort to Bunder Sheik and Khor Gadeer, the only ports belonging to the Ahkrabi or Hagrabee tribe. There is a narrow inlet, called Khor Bier Hamed, or Seylan, round the E. bluff, running 2 or 3 m. in a W.N.W. direction, at the foot of the N. mountain of the peninsula, which, with the flatness of the isthmus and the inland country, give Jebel Hasan, when at a distance, the appearance of an island. The village of Bier Hamed stands on the sandy plain about 5 m. N. by E. of the inlet just described, and about 3 m. from the shore of Aden Bay. It has a fort, and is the residence of Hamed Ben Maidee, the Sheik of the Ahkrabi tribe, who, notwithstanding the limited extent of his territory, which according to Captain Haines does not exceed 20 square miles, has generally contrived by his vigour and warlike activity to maintain his independence. He gave a kind reception to Captain Haines and his officers, although his people, until subdued by fear, manifested a very hostile disposition towards the party on landing.

ADEN BACK BAY (called **Bunder Toowayi** by the natives,) is formed between the peninsula of Jebel Hasan and Jebel Shumsan. This bay is about 3 m. wide at the entrance, and expands to 8 m., if the inner basin or harbour of Aden be included. Its general depth is 3 and 4 fathoms, shoaling gradually to the beach: across the entrance, or from Ras Marbat towards the Asses' Ears, $4\frac{1}{2}$ to 5 fathoms will be everywhere found, and 10 fathoms at 2 m. off the S. shores of the two peninsulas, with sand and mud inside and outside of the bay. Some caution is necessary for small vessels in anchoring on the E. side of the bay, off Ahliya, where the water shoals rather suddenly. The town of Aden (Abden,) is about 4 m. from the landing-place of Aden Back Bay.

Aden Harbour, or Inner Bay, is at H. W. between 3 and 4 m. long from N. to S., and 2 m. broad, but the sand-banks at its N. and E. shores, which dry at L. W. springs, contract the harbour to about two-thirds the above dimensions. The entrance, between the sandspit off the island of Ahliya on the N. and Ras Hejaf on the S., is, at L. W. about a third of a mile across; off Ras Hejaf is a sunken rock which must be avoided; the depths across the entrance, and in the centre part of the bay, are from 2 to $2\frac{1}{2}$ fathoms, decreasing towards the shore. This harbour is used solely by baghalahs and small vessels. There is a fine pier, and a large village has sprung up near it. The peninsular promontory of Ahden is almost divided from the main land by a creek on the E. side of this harbour, named Khor Maksa, similar to that behind Jebel Hasan, which gives

these lofty promontories—not very unlike in appearance—the aspect of two sentinel islands guarding the approach to the magnificent bay they enclose. The electric cable is laid down from hence to Suakin, Cosire and Suez; also to Bombay.

There are several islands in the Inner Bay; the E. and principal one, named Jezirat Sawayi, is 300 ft. high, and almost joined to the main land at L. W. springs: the others are named Marzuk Kabeer, Keis-el-Haman, Kalfetein and Feringi; and on the sand-spit at the N. side of the entrance are two small islets named Jam Ahli and Ahliya: outside, about 2 cables distant from the peninsula is the island Sheikh Ahmed, or Flint Rock, with a channel between of 2 fathoms.

The Outer Harbour for large vessels is very narrow, and only 1 m. long, E. by N. and W. by S., or parallel with the general shore of Aden, where the coal-sheds and Government offices are. The greatest depth is only 4 fathoms at L. W.: the average depth is $3\frac{1}{2}$ fathoms. Thus it will be seen how limited is the area of accommodation. **Moorings** are laid down for the Royal Navy, and for the P. and O. and French Companies. Large steamers of great draught are obliged to stay outside, to take in coal. The Harbour-Master attends to the berthing of vessels in the harbour. There are a Post-Office and Telegraph Office. A good scope of cable is requisite in mooring, in consequence of the sand-squalls which come from the N. and E. after very sultry weather, and which give but little warning. The usual anchorage is off Ras-ibn-Jerbain and Flint Rock, off the coal depôts situated near the former.

Supplies. The water supplied to the shipping from the wells is very brackish: but good water, distilled from the sea by a condensing apparatus, which has lately been erected in one of the small bays in the harbour, may be purchased at 13s. per ton, not including casks or boat-hire. Some ancient tanks, lately discovered near the town, has been cleared out, from which water may be procured at a less price, but the charge for carriage to the harbour would raise the cost to more than that of the distilled water. There are immense stores of coal at Ahden, the principal part of which belongs to the Peninsular and Oriental Company. Private merchants have large quantities stacked in the bay inside Flint Rock. There are great facilities for coaling-steamers. Provisions of every description are procurable; fruit and vegetables are scarce and dear. The population of Ahden was estimated at 25,000 souls in 1864.

LIGHTS. On **Ras Marahig**, the S.E. point of Ahden, in lat. $12^{\circ} 45' N.$, lon. $45^{\circ} 2\frac{1}{2}' E.$, a *fixed* light is exhibited, 244 ft. above sea-level, visible 20 m.; it is chiefly of use to vessels approaching Ahden from the E. Vessels, coming from the Red Sea will find that the light is hidden behind the S. cape of Ahden when bearing to the S. of E. by N., or if they are too near Jebel Hasan.

Light Vessel. A floating *fixed* White light, 35 ft. above sea, in lat. $12^{\circ} 47' N.$, lon. $44^{\circ} 58' E.$, is moored at 2 cables to the N.W. of Ras Marbut, in $2\frac{1}{2}$ fathoms water; the vessel is painted red, with a red ball at the mast-head, and exhibits a red flag during the day. At night, on a vessel entering, the light-ship fires a gun and burns a Blue light.

Anchorage. A vessel may anchor in any part of these bays; but the usual anchorage is between Flint Rock and Ras ibn Jarbein, off the coal-sheds, situated near the latter. (See also **Aden** in Chapters II. and VII.)

Tides. The tides in the bay are very irregular, being influenced by the currents outside. It is H. W., at F. and C., between the hours of 9 and 10; rise of springs about $8\frac{1}{2}$ ft. (Variation of compass $3\frac{1}{2}^{\circ} W.$)

Cape Ahden is a high rocky peninsular promontory, the most elevated part of which bears the name of Jebel Shumsan, and its highest peak is 1,776 ft. above the sea, visible 60 m. in clear weather. This peninsula has many projecting points, the most S. of which, Ras Sinaila, or Cape Ahden, is in lat. $12^{\circ} 44\frac{1}{2}' N.$, lon. $45^{\circ} 0\frac{1}{2}' E.$ On the E. shore of the peninsula, in lat. $12^{\circ} 46' N.$, lon. $45^{\circ} 2' E.$, stands the town of Ahden; to the S. and S.E. of which are two small bays, called respectively Bunder Duras and Bunder Hokat, separated by the narrow projecting point called Ras Marshig, which now has a *fixed* light. On the N. side of Bunder Hokat, and fronting the town of Ahden, is the fortified island of Seerah. It is a triangular rock, about 430 ft. high, and $\frac{1}{2}$ m. in circumference. The small haven which formerly existed between this island and shore is now filled up with sand, and the island itself is at L. W. united to the main.

Directions. The coast round Cape Ahden is bold to approach, and a vessel may always choose her own distance. A vessel coming from the W. may steer direct for the light-vessel, and pass round to the N. of it; thence to the E. for the anchorage. A vessel from the E. will sight Marshig Light when 20 m. off, on a clear night. Pass about 1 m. to the S. of it, to clear Ras Sinaili and Round Island (which bears S.S.W. from Jebel Shumsan); then after passing Ras Tarshein at 2 cables' distance, she may steer directly for the light-vessel, and on to the anchorage. A vessel working into the bay, towards the anchorage, may stand boldly across in any direction, being guided

by the lead and Marshig Light, until the light-vessel is reached, to the N. of which the depth becomes less, and short tacks must be made. It is advisable always to moor, the anchorage being rather confined; and good scope of cable should be given, in consequence of the sand-squalls, which come from the N. and E. after sultry weather, and which give but little warning.

Ahden Road, or Front Bay anchorage, has regular soundings, and although during E. winds a heavy swell rolls in, good anchorage and smooth water may always be found in June, July, and Aug., during the W. winds, under the lee of Seerah. The hot, dry gusts from the hills are usually strong and very disagreeable. The coaling station for the rapidly increasing commercial steam-fleet of the world ought to be on either side of Ras Marshig.

The narrow isthmus of Ahden is low and sandy, and the coast, of a similar character, takes a N.N.E. direction for 18 m., when it bends gradually to E. by S., and continues in that direction for 12 m., to Ras Saylan, forming the bay of that name. Ships should avoid this bay when blowing fresh from the E.: one ship was wrecked here in 1836, and several buggalows narrowly escaped.

Ras Saylan, or Seilan, in lat. $13^{\circ} 3' N.$, lon. $45^{\circ} 22' E.$, is a low, round, sandy beach, having on it a few date and larger trees inland to the N. and W. The bank of soundings extends from the cape about 10 m., shoaling from 100 to 40 fathoms, with 12 fathoms at $2\frac{1}{2}$ m. distance, gradually decreasing towards the shore. From Ras Saylan the coast runs in a N.E. direction 22 m. to the Saddle Hill, called Kermin Kalassi, and then bends more to the E. to Shugra, 4 m. farther E. The shore here is lined by a reef, about a mile off shore; and S. by E. from Kermin Kalassi Hill are the Barrow Rocks, 2 m. off shore, which are two rocky reefs, the N.E. one having 2 fathoms water on it, the S. one having 1 fathom. A ship, in standing in towards this part of the coast, should not shoal her water under 15 fathoms. There is a good channel between these reefs and the shore, having from 4 to 8 fathoms water. Mid-way between Ras Saylan and Kermin Kalassi Hill, inland, stand the town of Es-Sáli and the village of El-Khor. Several conspicuous peaks stand about 8 or 9 m. from the sea-board.

Shugra, or Sughra, the principal seaport of the Fudhlee province, is a small village, and the occasional residence of the sultan. It has a castle, and its small harbour is formed by a break in the reef which lines the shore; its depths are from 1 to 3 fathoms, and it is capable of containing twenty moderately-sized boats. The mark for entering, is Shugra Castle, on with a hill shaped like a barn, with a peak on its W. end, about 6 m. inland, which is also a good leading mark for taking an anchoring berth off the town. The *Palinurus* anchored in 9 fathoms, 3 cables outside the reefs. The Castle is in lat. $13^{\circ} 21\frac{1}{2}' N.$, lon. $45^{\circ} 39' E.$ It is H. W. at 8 o'clock on F. and C.; rise of tide 6 ft., the flood setting to the W. Variation $3\frac{1}{4}^{\circ} W.$ This place is well supplied with good water; bullocks, sheep, poultry, onions, and pumpkins may also be purchased.

The coast-line between Shugra and Zeghir Mugatain, which is 39 m. farther E., is irregular, jutting out into small points, the land near the sea being very flat, except in approaching Jebel Arraz, 13 m. to the E. of Shugra, where the high land approaches the shore. At 17 m. to E. of Shugra is a ruin on the coast, with a village to the N. of it, 3 m. in-shore, and a tomb about 7 m. farther to E. At this point also terminates the bank of soundings, 20 or 30 fathoms being here at the same distance from the shore as 6 or 7 between it and Ahden; and the 100 fathoms line is only about 2 m. off the shore hereabouts; though off Mugatain it extends 6 or 7 m. The range of mountains, called by the Arab navigators Jebel Fudhlee, and by the natives Jebel Kharazi, extends 20 m. parallel with the shore, the highest part of the range, Jebel Arraz, being 5,442 ft. The summit of this range is singularly formed into gables, peaks, and bluff points. The most conspicuous gable mountain is 3,900 ft. above the sea, and has an opening in it like an immense embrasure, giving it from the E. the appearance of a double peak, and suddenly falling in with an almost perpendicular descent towards the sea. The valleys are thickly covered with vegetation. Zeghir Mugatain is merely a small boat-anchorage, formed by the projecting rocks of the coast; the bottom is shoal and rocky.

Mugatayn, or Makatain, which is 5 m. E. of the little boat-harbour just mentioned, is the anchorage to which the trading-vessels resort for shelter during the N.E. monsoon. The sandy point, which has a black ruin on it, is in lat. $13^{\circ} 24' N.$, lon. $46^{\circ} 25' E.$, having several low, rocky islets and sunken rocks extending $\frac{1}{2}$ m. in a S. direction, and two shoal patches, one $\frac{1}{2}$ m. S.S.W., and the other nearly $\frac{1}{2}$ m. E. of the other islet, with channels of 4 and 5 fathoms inside of them. The islets, being much frequented by birds, are perfectly white. The *guano* is used for agricultural purposes. It is on the W. side of these islets that vessels anchor in depths according to their draught. The bottom is generally sandy, but has a few rocky patches. From Mugatayn to Howah, a distance of 15 m., the coast is flat and sandy, with 10 and 12 fathoms about 1 or $1\frac{1}{2}$ m. off the shore, which is free from danger.

Howah, or Howayah, is a small village 5 m. inland, but, by the chart, there appears also a

village near the sea, called Howtha; the point on which it stands is called Ras Urlaji. Howah is the chief village of the Ourljee, or Urlaji tribe, and the residence of the sultan, by whom Captain Haines and his officers were received with great hospitality. Although the government is despotic, the chief, who is an independent sovereign, is highly esteemed by his subjects. Bullocks, fish, and an abundant supply of good water may be procured. The soundings along the coast to the E. continue pretty regular, the depths at 6 m. off shore being about 160 fathoms, and within $1\frac{1}{2}$ or 2 m., about 20 fathoms. The coast from Ras Urlaji is nearly straight E. by N. to the village of Sheik Abderaman Baddas, a distance of 40 m., and about mid-way is the conspicuous white tomb of Sheika Hourba, 7 m. to the E. of which is the limit of the Urlaji territory.

Sheik Abderaman Baddas is a rather prominent point of this sandy coast, and has a mosque, near which are a few fishermen's huts that form the village. It is exceedingly poor and miserable, and at the time of Captain Haines's visit could only boast of one small boat for the whole party. He was informed that there was a 40-fathom bank off this part of the coast, and another nearly S. of Ras Hamari, but he did not find them. The coast, after passing Ras Abderaman Baddas, runs in a N.E. direction to **Ras Sufwan**, 15 m. distant. This is a slightly projecting point, thickly covered with bushes, in lat. $19^{\circ} 48' N.$, lon. $47^{\circ} 34' E.$ **Howra** is a village lying on the N.E. side of Ras Sufwan, and 4 m. farther is **Makanati Bluff**, which is a whitish-looking point, veined by dark strata; it has a rock close off it, and a bight is formed between the two capes.

The Hamari range of mountains, commencing on the shore near Howra, has a peak about 14 m. inland, rising to the elevation of 5,284 ft. above the sea, which, either from the S.E. or S.W., resembles the roof of a barn, and cannot be mistaken by ships approaching the land on these bearings.

Ras-el-Kosair, Gooseyn, or Hamari, is a rounded cape, 8 m. E. of Makanati Bluff, with two very large trees on it: and E. $\frac{1}{2}$ N. 21 m. from Ras Gosseyn is **Ras-el-Aseedah**, a prominent cape, having on its extremity a rocky conical hill, 160 ft. high, which is readily discernible at the distance of 5 or 6 m. A bay is formed between Ras Gosseyn and Ras-el-Aseedah, with deep water, bottom fine sand and shells or stones, the deeper part being towards its E. side, where there is 40 fathoms about 2 m. from the shore. The village of Ayn-Aboo-Mahbad stands on the sand-downs 2 or 3 m. inland of the centre of the bay; there is an excellent spring of water in its neighbourhood. Between this place and Ras-el-Aseedah there are two other villages, called Ayn Jowári and Gillah, the former $\frac{1}{2}$ m. inland, and the latter a fishing village about 3 m. N.W. of Bah-l-Háf.

Bah-l-Háf, or Bel'aaf, is a little bay on the W. side of Ras-el-Aseedah, and is a good anchorage in E. winds. The bottom will be found entirely free from rock, unless a vessel should incautiously run too far to the N.N.W., where, between 1 and 3 m. from the cape, a shoal-bank of rocks and sand extends $\frac{1}{2}$ m. from the shore. In entering with a strong E. breeze, the point should be rounded at the distance of 300 or 400 yards, having taken the precaution of reducing the vessel to snug sail, in order to meet the sudden gusts which may be experienced immediately after rounding the cape. When round the point, keep Black Barn Hill about a point on the starboard bow in running for the anchorage. This Hill is near the shore, and bears N. nearly 2 m. from the W. extreme point of the cape. The bank of soundings in this anchorage is steep; Captain Haines anchored the *Palinurus* within 350 yards of the S. rocky point of the bay in 15 fathoms, and after veering away 60 fathoms of chain, had 23 fathoms at his gangway. At the head of the bay stands a rudely-constructed square tower, garrisoned by one or two soldiers. Between Ras-el-Aseedah and Hisn Ghoráb, a distance of 10 m., the coast is irregular, with jutting rocky points and small intervening bays, and mid-way is the remarkable volcanic promontory of Ras Rotl, a round and considerably elevated cape with a crater in its summit.

JEBEL HISN GHORAB is a square-shaped, dreary-looking, brown hill, on a rocky cape, 456 ft. in height, with steep sides, having off it to the S. the island **Helani** separated from the cape by a narrow and shoal channel. This island is $\frac{1}{2}$ m. in length N. and S., and $\frac{1}{4}$ m. in breadth, in lat. $19^{\circ} 58' N.$, lon. $48^{\circ} 18' E.$ Hisn Ghoráb is the site of the ancient Cana, Canaan, formerly one of the most important places on the Arabian coast. Many interesting ruins of the ancient city remain; (See "Bengal Asiatic Journal," for 1834.) It may again become of commercial importance, as there are the makings of harbours behind Helani and Kadhrein islands.

Bunder Hisn Ghorab is a secure and well-sheltered bay to the E. of the cape which forms its S.W. point. It is $1\frac{1}{2}$ m. wide, but a rocky reef, extending from the E. shore, reduces the width of the entrance channel to $\frac{1}{2}$ m. Approaching from the S.E., a vessel should not near the E. point of the bay under a depth of 12 fathoms; and on passing Helani Island, in 8 and 9 fathoms, may stand right in for a square tower or house, which will be perceived at Bier Ali, on the N.E. shore of the bay, keeping it between N.N.E. and N.E. by N., and anchoring in 4 fathoms about $\frac{1}{2}$ m. off shore. Care should be taken not to bring the square house to the N. of N. by E. $\frac{1}{2}$ E., in order to

avoid the reefs. During the S.W. monsoon, a vessel in running in may keep more over to the W., so as to bring Cape Hisn Ghorab nearly S. $\frac{1}{4}$ W. of her. The soundings of the bay are generally clear sand, with an occasional patch of rock, and there is no danger within the harbour on its W. side. **Kadhrein, or Gulbrain Islands**, about 2 m. to the E. of Hisn Ghorab, and a mile off the shore, consist of one large and two lesser rocks, having a channel between the largest and the least 300 yards wide, with 12 fathoms water; also a channel between them and the shore, having 7 or 8 fathoms on the island side. The passage between the two smaller rocks is nearly dry at L. W.

SEKAH, or JIBOOS ISLAND, 4 m. S. $\frac{1}{4}$ W. of the above rocks, is in lat. $13^{\circ} 55' N.$, lon. $48^{\circ} 21' E.$, and has an elevation of 450 ft. above sea; the summit is flat, and white with *guano*, and may be seen 30 m. sometimes. The island is called Sekah by natives of this part, but Jiboos by Arab navigators, from its resemblance to a musical instrument of the Indians. The depths between it and the shore vary from 33 to 19 fathoms, with 100 fathoms 2 m. outside it.

Ras Makdah, or Mughda, is a moderately elevated cape, about 8 m. E. of Hisn Ghorab, having off it the island of Burhgha, which, being lofty and precipitous, has sometimes been mistaken for the cape; there is, however, a channel between them, through which the *Palinurus* passed, called Sanders Channel. It is about a mile broad, and perfectly safe, having from 15 to 17 fathoms in the middle. **Mughda Bay**, formed between the cape and the Kadhrein Islands, is described as a very excellent anchorage during the N.E. monsoon. It appears by the chart to have regular depths, from 7 to 16 fathoms, and to be free from danger, except in the N.W. part of the bay, where there is a sunken rock about $\frac{1}{4}$ m. from the shore. Mughda village is very small, and poorly supplied with the necessities of life; the water, also, is indifferent.

RAS-EL-KELB, or Cape Dog, is a low, sandy cape, $13\frac{1}{4}$ m. E. by N. from Ras Mughda, the shore on either side being of the same character as the cape itself. Caution should be used in approaching it at night or in hazy weather, as it is not then easily discernible; a depth of 14 fathoms is within 1 m. of shore, and 50 fathoms about 2 m. off. Variation in 1863, $3^{\circ} W.$

Ras Rehmat, or Cape of Wind's Death, 8 m. N.E. of Ras-el-Kelb, is elevated about 300 ft., and is the commencement of the mountain chain which extends to within 15 m. of Maculla; it also forms the E. boundary of the Wahidee territories. Sand from the plain has been blown up into a great heap on the S.W. face of the hill by the S. gusts of the S.W. monsoon. It takes its name (*lull of the wind*, a term used by Arabs for a calm) from the effects experienced by the baghalahs in running up the coast during the *tadh-bireh*, or early part of the S.W. monsoon; the Arabs consider that, when they round the point, the violence of the wind has abated. The coast from Ras Rehmat continues in a N.E. direction to Ras Asassah or Asr-el-Hamra, 6 m. distant, between which cape and Ras Broom, 8 m. farther, is Gubet Gulloon, or Gollain, which is described as an indifferent anchorage.

RAS BURROOM, or BROOM, in lat. $14^{\circ} 18\frac{1}{4}' N.$, lon. $48^{\circ} 56' E.$, is a bold, craggy headland, visible at the distance of 38 or 40 m. A reef extends from it $\frac{1}{4}$ m., on each side of which the water appears to be deep.

Bunder Broom is a bay to the N. of the cape, and is a secure anchorage in the S.W. monsoon; but having the points which form it nearly N. and S. of each other, it is open to all E. winds. Captain Haines recommends anchoring in 6 or 7 fathoms, with the town of Broom bearing N.W. by N., and Ras Broom about S. by E., but of course a ground swell will roll in during the S.W. monsoon. Wood, water, and other supplies, may be procured at the town. Between Ras Broom and Ras Maculla, a distance of 15 m., the country is a plain, enclosed by a semi-circular range of mountains which terminates in these two capes. The soundings off the coast are generally pretty regular, deepening towards Maculla. Midway between Broom and Maculla stands the town of Fooah, the inhabitants of which appear to entertain a strong dislike to Europeans; and on Captain Haines's visit they insulted his officers during a ramble in the valleys, notwithstanding the evident fear with which the presence of the ship had inspired them. The place is not much frequented by strangers. (*See POPULATION and TRADE*, at end of Chapter.)

MAKALLEH, or MACULLA, is the principal commercial depôt on the coast of Arabia. The town stands on a projecting, rocky point, which has a small bay on each side of it. The flag-staff on the house of the Governor is in lat. $14^{\circ} 30\frac{1}{4}' N.$, lon. $49^{\circ} 6' E.$, and is situated beneath the remarkable hill called Jibel Garrah, the circular summit of which rises above the steep cliffs commanding the town, and on which six towers have been erected for its protection. The base of these cliffs is lime-stone, with a superstructure of white marble traversed by grey and blue veins, the surface having a slight sandy appearance: this high land can be seen at 40 m. distance. The trade of Maculla is very considerable, and is carried on with India, the Red Sea, and the Abyssinian ports, in rice, cotton, cloths, coffee, dried fruits, &c. The horrid traffic in slaves is also fearfully encouraged by the import of great numbers of both sexes. The duty on goods from India is 5 per cent., and

vessels are charged anchorage dues of 5, 10, or 15 dollars, according to their size. The duties, according to Captain Haines, amounted, in 1834, to 3,900 dollars, which in 1836 were increased to 6,000. (*See also Trade* at end of this Chapter.)

Maculla Bay may be said to extend from Ras Broom to Ras Maculla; but the name is more properly restricted to the E. portion of this large bight, comprehended between the town of Fooah on the W. and Cape Maculla on the E. There is very deep water in the centre of the bay, the anchoring bank extending not much more than $\frac{1}{2}$ m. off the shore near the town, increasing to nearly a mile in width off the low, sandy beach, towards Fooah. Of the two small bays near the town, and which afford shelter for boats, the W. one is the most frequented. It has the town on the E., and is protected on the W. side by a reef which projects $\frac{1}{2}$ m. from the shore. There is a sunken rock a short distance off the reef, with $1\frac{1}{2}$ fathoms on it; vessels, therefore, should be cautious in standing too close in near this spot. In coming into the bay from the S.W. or the W., to avoid the shoal water on the W. side of the anchorage, the flag-staff should be brought in one with the second tower, to the E. on the cliffs, and when in 12 fathoms the vessel should be rounded to, which will bring her into 8 or 9 fathoms on anchoring.

There is sometimes a heavy swell rolling into the Bay when the sea-breezes blow strong, but the wind usually lulls towards evening and the sea goes down. Maculla harbour is reckoned one of the best, and the principal commercial town on the S. coast of Arabia. The natives assert that a vessel having chain-cables might safely ride out the S.W. monsoon here; they also say that the wind at this season blows with great violence during the day, but decreases as the sun declines, often blowing strong enough in the morning from the N.W. to carry a ship clear to sea. The weather in the Bay is very warm during the middle of the day; and on shore the heat is excessive. Land and sea-breezes, with light showers of rain, are occasionally experienced in Oct., Nov., March, and April, and often in June and July: these tend to cool the atmosphere.

Ras Maculla is the narrow, but rather high neck of land, projecting into the sea, about 2 m. to S.E. of the town. There is a rocky patch off it, about $\frac{1}{2}$ m. to the S., having less than 4 fathoms on it, with 16 or 18 fathoms inside. The bay formed on the E. side of Ras Maculla is called Bunder Rowayni.

The **Coast** from the high land of Maculla is straight, and the country is flat and barren for nearly 20 m. to the E.N.E. to the table-land, called **Jebel Dhebah**, the shore being bold and safe to approach. Immediately to the N.E. of Ras Maculla stands the fishing village of Raghib, with its mosque, and 3 m. from it the town of Bu-Heish, surrounded by date-trees, and possessing numerous springs of water. Ten miles farther, towards **Jebel Dhebah**, are the ruins of the once flourishing town of Shehr, formerly the seat of government of the Kasaidee tribe, but now almost deserted, in consequence of the chief having removed his residence to another city. The population may now amount to 300 persons, the greater part of whom are fishermen. **Jebel Dhebah**, before mentioned, is an oblong table-hill near the sea, and being entirely detached, it becomes an excellent guide for making Maculla from the E. **Sook-al-Baseer** is a considerable town, inland to the N.W. of **Jebel Dhebah**. Tobacco, vegetables, and excellent water may be obtained there; also remarkably good dates. Its mosque may be distinctly seen from the sea.

SHEHR, or SHAHAH, about 8 m. E. by N. of **Jebel Dhebah**, is a very large town, being upwards of a mile in length, and the capital of the province of the same name. The sultan's house or castle is the most conspicuous building in the town. It occupies an elevated position, is fortified at each angle with a circular tower, and may be seen from seaward long before the rest of the town. It is in lat. $14^{\circ} 43\frac{1}{2}'$ N., lon. $49^{\circ} 38'$ E. The anchorage is an open roadstead, with regular soundings, the depths 1 m. off the shore varying from 7 to 12 fathoms. About the best position is in 7 or 8 fathoms, with the principal mosque bearing N. Vegetables, bought from the neighbouring villages, are at all times to be procured here; and sheep may also be purchased. The water is bad. **Jebel Yucalif**, a hill 4 m. N.E. of the town, on which are the remains of a zig-zag wall, is considered the best mark for ships in running in for **Shahah Roads**; a vessel has only to keep this hill a little on the starboard bow till the town is visible.

Hami, or Hahmee, is a village 13 m. to the E. of **Shahah**, situated just beneath a double hill, and having near it a grove of date-trees. The coast appears by the chart to consist of steep, rocky cliffs, which extend several miles on each side of the town. The soundings are regular, and the shore may be approached at any part to the depth of 8 or 10 fathoms. Anchorage about a mile off shore may be taken, in 7 or 8 fathoms, sand, shells, and broken coral. Supplies are very expensive, and difficult to be obtained. The sheep are small, and the water not very good. A duty of 3 per cent. is demanded from all vessels anchoring here on every article landed or purchased. There are numerous hot springs in the neighbourhood of **Hahmee**; those examined by Captain Haines had a temperature of 140° .

The Coast between Hahmee and Ras Sharma forms a large bay, comprehending within it the anchorages of Sharma and of several places of less note. The soundings on the coast are generally regular, the depths varying from 7 or 8 fathoms a mile off the shore, to 38 and 40 fathoms 3 m. off, outside of which the depth rapidly increases to 100 fathoms. A high range of mountains stands parallel to the coast, at from 10 to 15 m. off. Jebel Jamboosh is to N. of Maculla, and Jebel ibn-Shamayik to N.E. of that. The Hamoom tribe own the coast territory from Fooah to Misenat, a distance of 100 miles.

SHARMA BAY, where are the ruins of Hisn-el-Misenát, is bounded by Hahmee Point on the W., and Ras Sharma on the E., and is considered the best anchorage on the coast for shelter in the N.E. monsoon. The E. shore of the Bay runs in a S.S.E. direction till terminated by the Cape Ras Sharma, which curves round and projects to the S.W., affording protection from the S.E. winds. One-third of a mile W. of the cape is a rock, called Jezirat Sharma, 70 ft. high, having a channel of 5 or 6 fathoms between it and the cape, and 10 or 12 fathoms outside. There are several villages round the Bay, which give names to the smaller bays, formed by the projecting points of the shore. These small bays are used by the boats and native vessels. The most frequented anchorage is off the village of El Ghurn, in from 2 to 5 fathoms. The cove called Bunder Sheser, immediately to the N. of the cape, affords also good anchorage in 4 or 5 fathoms. It is H. W. on the F. and C. of the moon at 9 h. Rise 8 ft. Variation $2\frac{1}{2}^{\circ}$ W. The towns of Dees and Thubba are situated a few miles inland, in the neighbourhood of which are hot springs, of peculiar efficacy in rheumatic complaints.

The coast from Ras Sharma runs in an E. direction to Ras Baghashoo, a distance of 7 m., forming a line of lime-stone and chalk cliffs, rising between 300 and 400 ft. perpendicularly from the sea. These cliffs may be clearly seen at the distance of 25 m. Mid-way between the two capes there is a hollow opening in the cliff, near which is the village of Dthugaum. The opening is fronted by a sandy beach, off which is an anchorage for boats. Four or five miles N. of Ras Baghashoo there is a mountain, called Jebel Hamoom, but marked in the chart Sand-hill. The neighbourhood is tolerably well cultivated, and has springs of good water; it is also interesting to the antiquary, from the numerous hieroglyphic inscriptions found here, in the same character as those of Hisn Ghoráb. From Ras Baghashoo, the coast runs E.N.E. for 12 m. to Ras Gossierh, to the E. of which, a mile inland, stands the town of the same name. There is a square fort $\frac{1}{2}$ m. N.N.W. of the town.

Ras Kosair or Gossierh is very rocky close in shore, in the neighbourhood of the point, from which a shoal extends nearly $\frac{1}{2}$ m. to the S. and $\frac{1}{2}$ m. to the W.; but a vessel may find good anchoring-ground, but no shelter, off the reef in 12 or 14 fathoms. Sharks abound on this coast, and are caught here in great numbers, the body being eaten by the natives, and the tail and fins reserved and sent by way of Muskat to the Chinese markets. The coast to the E. of Gossierh for 22 m. to Misenaut is low and uncultivated, having several villages and towns near the sea, the principal of which is Raidah, about mid-way between the towns just mentioned. Raidah is the residence of the chief of the district, between Ras Baghashoo and Misenaut, and contains about 700 inhabitants, the houses of which are principally built of mud and stone, and huddled together without any apparent regard to comfort or convenience. The trade, which is very trifling, is chiefly carried on between this place and Shahah and Maculla, Socotra, Mocha and Zanzibar, and consists in frankincense, aloes, ambergris and sharks' fins; the last-named articles being the most lucrative. The water off the coast is very deep, there being as much as 20 fathoms within $\frac{1}{2}$ m. off the shore, suddenly deepening to 120 and 130 fathoms 2 m. off.

Ruins of Misenaut. At 12 m. to E. of Raidah stand these ruins, in lat. $15^{\circ} 8' N.$, lon. $50^{\circ} 37' E.$ They are interesting to the antiquary, and appear to have once formed part of an important town. The country near them is now a swamp, and traces of lagoons or harbours are visible near the ruins. Effusions of **black basalt** are found in several places on the plain between Raidah and Wadi Maseelah. The Arabs call them *Hareek*, or burnt place. At each there is one cone (or more,) about 100 ft. above the surrounding ground; and around each cone there is a low field or tract of basalt, strikingly contrasting by its blackness with the light colour of the plain. There are no signs of present active volcanic eruption. Near Raidah the basalt had streamed into the water-courses, and appears at their openings on the shore in black rocks, contrasting strongly with the white lime-stone on either side.

PALINURUS SHOAL (Abdul Kuri,) is situated 10 m. S. $\frac{1}{2}$ E. of Misenaut, and was discovered by Captain Haines, who thus describes it:—It extends 1,850 yards in a N.N.W. and S.S.E. direction, and is from 150 to 300 fathoms broad, with a bottom of alternate rock and coral. The soundings round this shoal cannot be relied on, as they vary very suddenly, and do not always decrease in approaching it. The nearest land is that of Misenaut, the ruin being nearly in a line with the E. bluff of Sheik-Háwi Gap, an opening in the mountain 10 m. inland. When on the

shoal this gap lies fairly open, its W. bluff bearing N. $\frac{1}{2}$ W., and the E. end of Sheik-Hawi Mountain N. by E. $\frac{1}{2}$ E. The sandy beach on the main land is not discernible. Captain Haines recommends navigators to avoid this spot, by passing between it and the shore, or by keeping a good offing, as he believes it to be rapidly shallowing.

The least water found on it was 17 ft., and the soundings near it were as follow:—N. of the shoal 2 m., 120 fathoms; N.E. at $\frac{1}{2}$ m. off, 120 fathoms; E. $2\frac{1}{2}$ m., 96 fathoms; S.E. 2 m., 64 fathoms; S. $2\frac{1}{2}$ m., 130 to 140 fathoms; S.W. at 1 m., 80 fathoms; W.S.W. at $\frac{1}{2}$ m., 105 fathoms; W. at 1 m., 130 fathoms; N.N.W. 2 m., 140 fathoms. By the chart there is another bank 2 m. nearer the shore, but with not less than 25 fathoms on it.

The coast from **Misenaut** runs in an E. by N. $\frac{1}{2}$ N. direction, and is nearly straight; the soundings appear to be regular, varying from 12 to 15 fathoms at 2 m. off shore.

Sihoot is 33 m. to the E. of Misenaut, in lat. $15^{\circ} 12' N.$, lon. $51^{\circ} 12' E.$; soundings for the hand-lead extend further off shore hereabouts; the ship *Topaze*, within 3 m. of it, had 8 and 7 fathoms. About 2 or 3 leagues E. from it, the coast is high and steep-to, forming two or three small bays. **Ras Akab**, at 8 m. to E. by N. of Sihoot, is a high, red, sloping, rocky point. **Ras Atab** is 8 m. further, and **Bunder Atab**, or **Liban**, is the bay beyond, extending to Ras Sharwain.

RAS SHARWAIN, or **KESHIN POINT**, in lat. $15^{\circ} 19' N.$, lon. $51^{\circ} 39' E.$, is 27 m. to the E.N.E. of Sihoot. Its highest peak, which stands 2 m. to the W. of the Point, is 750 ft. above sea, and may be seen 10 or 12 leagues; when viewed from the E., two sharp peaks, called the Ass' Ears, are discerned, which make it easily known, as they are near the point. The cape is high and dark, and forms the W. limit of Keshin Bay; it is bold to approach, with deep water under the cliffs. There is anchorage in the bay to the W. of Keshin Point, which is the E. limit of Bunder Liban, and affords shelter from N.E. and N. winds only. Sand blown high up against the S. face of Sharwain Hills, attests the violence, or rather the continuous strength, of the S.W. monsoon.

Bunder Lask is the deep bight close round the N. side of Ras Sharwain, affording excellent shelter during the S.W. monsoon for vessels of any size. The town of Keshin, one of the principal ports of the Mahrah tribe, and the residence of the Sultan, lies nearly 5 m. to N. by E. of the cape. When the Ass' Ears bear W. by N., the bay to the N. of the point begins to open, and has in it regular soundings, from 12 fathoms at the entrance, to 4 or 5 fathoms, sandy bottom, near the villages in the bottom of the bay, where ships may lie sheltered from S.W. winds. The village of Keshin has a well to the W. of it, nearly a mile from the shore, the only place where water can be procured.

Ras Derkah, at 14 m. to E.N.E. of Ras Sharwain, is a bluff, precipitous, sharp point, formed of rugged and nearly perpendicular cliffs, from 200 to 400 ft. in height; the point projecting to the S.E. for $2\frac{1}{2}$ m. from the line of coast. Thus it affords good shelter and anchorage during the S.W. monsoon. A **sunken rock**, however, lies at $3\frac{1}{2}$ m. to the N.E. of the cape, or about 2 m. to the E.S.E. of the N. extreme of Derkah cliffs, where sandy coast recommences. Saghar and Hasweil (both affording good water,) are villages along this coast. **Kesid** (or Teif, as Arab seamen call it) is a small fishing village under the high land of Fartak, and about 3 m. to the W. of the tip of the cape. Off this village is the usual anchorage for boats, during the N.E. monsoon, trading with the Mahrah tribe, who do not seem well-disposed towards Europeans. **Wadi**, one of the most powerful towns belonging to the Mahrah tribe, lies about three hours' journey from Kesid landing-place. (See *Population and Trade*, at end of this Chapter.)

RAS FURTAK, in lat. $15^{\circ} 39' N.$, lon. $52^{\circ} 14' E.$, a beautiful promontory, is about 2,500 ft. high, may be seen at 20 leagues' distance in clear weather, and cannot be mistaken, as it projects far into the sea, rising perpendicularly in some places; when 10 or 12 leagues off it, in a S. direction, it appears like an island with a gap in the middle. Its E. face is a sheer scarp, about 3 leagues in length N. and S., and this has some 1,900 ft. of elevation above the sea, from which it is distant about 2 m.; this E. bluff, as seen from a distance of 10 or 15 leagues to the S., is in lat. $15^{\circ} 38' N.$, lon. $52^{\circ} 11' E.$ Ras Furtak is supposed to be the **Suagros** of the *Periplus*.

Khor Kalfot, in lat. $15^{\circ} 52' N.$, and situated 14 m. to the N. of Ras Fartak, is a small creek in the depth of a little bay, where boats of 30 and 40 tons are hauled up during the S.W. monsoon, the premonitory swell of which commences to roll into the bay in the month of April, causing a heavy surf on the beach, though it is sheltered from the monsoon wind. As a general rule, the winds are light and variable all the year round in the depth of the bay under the lofty range of Furtak.

The soundings abreast Cape Furtak are from 9 and 17 fathoms close in, to 50 fathoms 3 m. off shore, and the coast to the N. of it takes a N. direction, forming an extensive and deep bay, in which there are soundings proper for anchorage. Variation off the cape, $1\frac{1}{2}^{\circ}$ W. The current ran strong to the E. in March, and is known to be very strong in S.W. monsoon.

Gubet-el-Kamar. Ras Sejer lies about 100 m. to the N.E. of Ras Furtak, in lat. $16^{\circ} 45' N.$, lon. $53^{\circ} 38' E.$, having between them the extensive bay, Gubet-el-Kamar. From about 18 m. N. of Ras Furtak, the shore of the bay for 40 m. to the N.E. appears to be low and sandy, with soundings to 30 and 40 fathoms at 10 m. off. The Furtak range, above Kalfot, runs back to the N.W. for 20 or 30 m.; then again the mountains approach the shore, rising to an elevation of 2,000 and 3,000 ft., continuing in a ridge to the E. beyond Ras Sejer. Off this high land the coast is steep-to, having from 50 to 100 fathoms 4 m. off. Mount Sejer, near the cape, has 3,380 ft. elevation above the sea. **Damghot**, 65 m. to the N.E. by N. of Ras Furtak, is the only sea-port in Gubet-el-Kamar; off this place a reef of rocks extends 250 yards to the S.E., forming a landing-place on its E. side, when the S.W. swell is not very heavy. The whole range of mountains, from the N. by W. of Damghat to Ras Sejer, comes under the general appellation of *Jebel Kamar*, and they are clothed with wood from base to summit.

Ras Risoot is 27 m. E.N.E. from Ras Sejer, having an islet close to the point. There is a small bay (*Bunder Risoot*) immediately to the N. of the cape, having from 3 to 4 fathoms water in it. A vessel would find good anchorage and shelter during S.W. winds, in from $4\frac{1}{2}$ to 5 fathoms, about 4 cables to N.W. of the islet off Ras Risoot. Ruins of the ancient city *Al-Balad*, are to be found about 8 or 9 m. to N.E. by E. of Ras Risoot; and near *Dyreez*, a lake of good water. Variation, $1\frac{1}{4}^{\circ} W.$ The coast from *Bunder Risoot* runs nearly due E. 35 m. to *Merbat Bay*.

MERBAT BAY has low land on its E., but high land on its N. side, a range of mountains passing near the head of the Bay and along its N.W. shore. *Jebel Doahn*, or *Merbat Peak*, 3,690 ft. above sea, stands 5 m. to N. of the town. Ras Merbat is low and rocky, projecting to the S.W. and forming the S.E. side of the Bay; it is in lat. $16^{\circ} 58' N.$, lon. $54^{\circ} 41' E.$ The shore is safe to approach, with regular soundings, and the cape may be passed within $\frac{1}{2}$ m. in 10 or 12 fathoms. The town, consisting of about 200 inhabitants (who are well-inclined towards the English,) is 2 m. inside the point; opposite to which is the best anchorage, in 7 or 8 fathoms, about a mile from the shore, with the point bearing S. The water here is brackish, although Merbat is a common resort of coasters to obtain water. About 4 m. to the W. there is a mountain rivulet of good water, where vessels can fill up their tanks in the N.E. monsoon.

Captain Smith, with a convoy of 17 sail of store-ships, put into this place, remained in the road eleven days, and filled up their water. This was effected by sinking casks near the mosques; the water was brackish, but it did not injure the health of the people. Fish were plentiful; some goats, sheep and bullocks were procured; the latter were scarce, but fodder more so. This place ought not to be chosen by ships requiring refreshments, except in cases of real necessity; a few lean bullocks, goats, or a few fowls, are all that may reasonably be expected. The inhabitants are at first shy to strangers, and although they may afterwards appear friendly, ought not to be implicitly trusted. It was formerly imprudent for people landing in boats to venture far from the beach, or to sleep on shore in the night. The natives were generally armed with spears.

Merbat is the principal trading town of the province of *Dofar*, which yields frankincense and gum-arabic. (*See Trade*, further on.) Rain seldom falls at Merbat, or on the belt of sterile low land between it and Ras Noos; but to the W., the mountains and valleys of *Dofar* receive a great deal. From Merbat Bay to the distance of 7 or 8 leagues to the E., a low, level plain fronts the sea, which seems to be about 2 leagues in breadth, and inland is bounded by the base of a ridge of steep mountains, called *Jebel Sabhan*. The W. end of this ridge is directly over Merbat Bay, from whence it extends a great way to the E., along the N. side of the low land, until it joins the coast near Ras Noos. This high ridge may be seen at 20 leagues' distance in clear weather, and the W. part of it near the bay is called the *Peak of Merbat*, which is 3,690 ft. above the sea. An isolated high mount, resembling a sugar-loaf, stands on the low land about 12 m. to the E. of Merbat, is called *Brown Hill* on the chart, and may be discerned nearly 20 leagues' distance. There is a second sugar-loaf hill, *Jebel Kinkeri*, in about lat. $17^{\circ} 2' N.$, lon. $55^{\circ} 1' E.$, on the low land farther to the E.; and a third, *Jebel Maseera*, near Ras Noos. **Bunder Kinkeri**, under the hill of that name, is a small, sandy bay, with irregular soundings, varying from 8 to 12 and 16 fathoms; the bottom rock and sand. It shelters from N.E. winds.

Tides. It is H. W. about 9 h. at F. and C. of moon, and the tide rises on the beach 6 or 7 ft.

The Belat, or N. wind of the *Kooria Moorria Bay*, seems to be hindered, by the lofty *Jebel Sabhan* mountain range, from blowing down upon the low land of Merbat; and it blows over that place as a strong S.E. wind during the day, with light and variable airs at night. The Belat blows at Risoot, but not to the W. of Ras Sejer; indeed, its limits are from the latter cape to *Masserah Island*, and its periods are from mid-Dec. to mid-March.

RAS NOOS, in lat. $17^{\circ} 14' N.$, lon. $55^{\circ} 17' E.$, about 40 m. by the bend of the coast to E. and N. of Merbat, is a low but prominent rocky cape, at the S.W. extreme of *Kooria Moorria*

Bay, and was formerly called by navigators Ras Jingery. **Jebel Noos**, 1,200 ft. high, looks down upon the cape, at $1\frac{1}{2}$ m. to the W. of which it stands, like a gunner's quoin; the highest part is near the sea, thence sloping down to the W. The cape, before known as Ras Noos, is Ras Hasek, and is 8 m. further to N. The general direction of the coast between these capes is N. by E., the land rising at once from the shore to a considerable elevation at the E. side of the Jebel Sabhan range. Jebel Habareed, to N.W. of Ras Noos, is 4,000 ft. high. There are no soundings under 40 or 100 fathoms until close to the land, except in **Bunder Noos**, the little bay on the N. side of Ras Noos, where the bank extends 2 m. off shore. There are springs of good water at the head of this bay, and it affords shelter from S. and from W. winds in 9 fathoms, about $2\frac{1}{4}$ or 3 cables from shore.

KOORIA MOORIA BAY is comprehended between Ras Noos and Ras Sherbedah, in lat. $17^{\circ} 58' N.$, lon. $56^{\circ} 19' E.$, having off it several islands. Ras Hasek is more properly the S.W. point of the bay; it projects from the usual coast-line in a sharp point about $\frac{1}{4}$ m. due E., having immediately behind it the mountain of Jebel Hasek, backed by Jebel Subhan, which rises to an elevation of 4,000 ft. There is no bottom at 100 and 130 fathoms at the distance of $\frac{1}{4}$ m. off the extremity of the cape, but the bank of soundings commences on its N. side, the outer edge of the bank extending from the cape to the islands, the nearest of which, Haski, lies 15 m. E.N.E. of it. **Bunder Hasek**, a small bay on the N. side of Ras Hasek, affords shelter from S. winds close to the shore. The shore towards Ras Therrar, about $4\frac{1}{4}$ m. N.W. of Ras Hasek, is irregular and indented, with a small sandy cove fronting the Wadi Rekot Valley about mid-way, where there is a fresh-water spring. This is at the S. extreme of Gubet-el-Doom, a bay which shelters from S.W. winds, and affords fresh water at many places.

Ras Therrar is a low sandy point; but about a mile to the S. of it the land rises into steep cliffs backed by high table-land, which is the character of the W. shore of the bay for 25 m., with the exception of a spot 7 m. N. of Ras Therrar, where a low, sandy beach fronts a valley in which there is a pool of fresh water. Nine miles N.E. of this sandy cove, about the centre of the range of cliffs, is Ras Montejib, with a rugged peak close to the N. of it. The steep cliffs terminate 7 m. N.N.E. of this cape, and the mountain-range runs back for 2 or 3 m., and after continuing in a direction parallel with the shore, again reaches the sea at Shuamea Point. The shore and the plain fronting the mountains is low and sandy, with some bushes on it, the coast-line being nearly straight in an E.N.E. direction. There is a sand-hill near the cliffs at the W. extreme of the low lands, and a clump of trees or bushes, with fresh water near them, at the E. extreme by the high land or Dark W. point of Shuamea. The coast from this point again assumes a bold character, being composed of steep cliffs, which run in an unbroken line for 25 m. in an E. direction to the E. of Ras Minji.

Ras Shuamea is a point 9 m. E. of the Dark point of Shuamea, and 10 m. farther, in the same direction, is the point called Ras Minji, having fresh water near it. The cliffs, about 2 m. E. of Ras Minji, are 700 ft. high, from thence decreasing, until leaving the shore about 2 m. farther to the E. they terminate a mile inland. Between this point and Ras Gurwao, or Karwao, the shore is low and sandy for 7 m., resuming its cliffy character about 2 m. W. of that cape. Ras Gurwao and Ras Sherbedah, a cape 2 m. E. from it, as well as the intermediate coast, have the steep, rocky character of the cliffs already described. There is a sand-hill a mile to the W. of Ras Gurwao, and the cliffs here assuming a concave outline, are fronted by a piece of low land, the shore of which appears to be lined with rocks. At **Ras Sherbedah**, a steep projecting bluff head land with a tabular surface, in lat. $17^{\circ} 58' N.$, lon. $56^{\circ} 20' E.$, the coast suddenly alters its direction from E. to N.N.E. and N.E. towards Ras Saugra.

Bunder Sherbedah is the name, given by Arab boatmen, to the narrow strip of good anchorage, with 5 to 10 fathoms water, to the S. of Ras Sherbedah, towards Gurwao. Here the native vessels, running down the coast, take shelter from the Belat or N. wind. Vessels, coming from the N.E., should round Ras Gurwao very close, and be prepared for strong gusts, both in rounding the capes, and in making for anchorage, where they can get fresh water at the pool or lake, which has a large mangrove tree to mark its position, just to the W. of Ras Gurwao.

The Kooria Moorla Islands are five in number, viz., Haski, Soda, Helahneea Jibleea, or Kibleea, and Kirzawet, or Rodondo. The first four are situated on the edge of the bank of soundings, and lie in a line nearly E. and W., parallel with the N. shore of the bay, from which they are distant 22 m. They are generally bold and rocky; their hills, for the most part, rising into regular conical peaks.

HASKI, the W. island, lies, as already stated, about 15 m. E.N.E. of Ras Hasek. It is $1\frac{1}{4}$ m. long from N. to S., and about $\frac{1}{4}$ m. broad, having high peaked hills near its S. point. It is of granite, without a vestige of vegetation, and its surface is quite white, covered with guano. The edge of the bank passes very near the S. point of this island, there being at $\frac{1}{4}$ m. from it, no bottom

at 145 fathoms. The average depths round the island, 1 m. off its shore, are from 25 to 30 fathoms, and there is a rock which dries at L. W. $\frac{1}{2}$ m. off its W. shore. The rock bears about W.S.W. from the N.W. point of the island, and has a channel of 16 fathoms inside it.

SODA ISLAND lies 12 or 13 m. E. of Haski, and is 3 m. long from E. to W., and $1\frac{1}{2}$ m. broad. The land is high and formed into peaks, the highest of which, near the centre of the island, attains an elevation of 1,310 ft. Its shores are rocky and pointed, and there is a sunken rock surrounded by a bank, about a mile to the W. of its S.W. end: there appears to be a narrow channel inside this rock, having 5 or 6 fathoms in it. There is also a ledge or spit of rocks extending from a point near the middle of the S. shore, which forms the S.E. shelter to a small cove, on the W. side of the point, a good anchorage in the N.E. monsoon, and during Belat winds, having 9 or 10 fathoms in its centre, with Jebel Soda bearing about N.E., and the W. point of this cove in a line with the S.W. point of the island; the tip of the rocky spit will then bear about S. by W.

The soundings round Soda, at a mile distance, vary from 10 to 40 fathoms, the bottom being of sand and rocks on the E. and W. sides of the island; sand and shells, and sand and coral, on its N. side; and gray sand on its N.W. side. The edge of the bank passes within $\frac{1}{2}$ m. of the S. shore of the island, there being no bottom at 95 and 100 fathoms at that distance off. There is a well near the S.E. point.

HELAHNEEA, the largest of the Kooria Mooraa group, is about 16 m. in circumference, and is situated $4\frac{1}{2}$ m. to the E. of Soda. Its lofty granite peaks (the highest, 1,500 ft. above sea,) give it a rugged appearance, and it is further remarkable from the bold projecting promontory of limestone which forms the N. part of the island. The extreme point of this promontory is called Ras Helahneea, or Ereekh-er-Raheeb, and is in lat. $17^{\circ} 32\frac{1}{2}'$ N., and lon. $56^{\circ} 2'$ E. This limestone bluff is 1,645 ft. high, and presents a rugged and nearly perpendicular cliff to the sea for upwards of a mile on each side the cape. There are shoals and rocks extending from $\frac{1}{2}$ to 2 m. off the W. and S.W. points of the island. One of these rocks, situated $\frac{1}{2}$ m. from the point, dries at L. W. spring-tides: between these coral patches there are narrow channels of from 5 to 10 fathoms.

Gubet-er-Raheeb is the N.E. bay of the island, between Ras Helahneea and Ras Sair, and affords good shelter from any S. winds between S.S.E. and W., and good anchorage in 7 to 10 fathoms. There are two wells of fresh water to the S. of this anchorage.

The Belat Winds, or Northerers, occurring between mid-Dec. and mid-March, render this place unsafe then. During the occupation of Jezirat Helahneea by the Red Sea and India Telegraph Company, one of these belats blew violently for twenty days; they generally last from one to three days, and sometimes for an entire week. On the 19th Dec., 1834, the *Reliance* whaler was wrecked on the Kooria Mooraa Islands during a furious belat from N.W. Captain Haines, of the late Indian Navy, who surveyed the bay and islands in 1834—1835, found numerous remains of wrecks. The winds and weather hereabouts appear more boisterous than at any other part of the coast.

Ras Sair, in lat. $17^{\circ} 30'$ N., lon. $56^{\circ} 5'$ E., the E. point of the island, is fronted by a rocky bank, which is continued from the cape 2 m. along the S.E. shore, off which it extends nearly a mile; and there is a 3-fathom patch off the S. point, bearing S.E. by S. from it $\frac{1}{2}$ m. The large bay, Gubet-er-Raheeb, is formed between the N. and the E. points of the island, in which there appears to be good anchorage in from 7 to 14 fathoms.

Ras Shatt is the name given by Arab seamen to the W. point of this island, which the islanders call Ereekh-i-Fraont. In the N.E. monsoon, vessels can anchor in 5 or 6 fathoms, about 3 or 4 cables to the S.W. of this point, which has a deep bight on its S. side, and a well about 1 m. off. Caution is necessary to avoid the four or five scattered rocky reefs which lie off Ras Shatt; the outer one is nearly 2 m. to W. by S. of the cape. There are a few huts on the N.W. side of the islands, and wells in several places near the shore. The bank of soundings terminates about 2 m. S. of the island, beyond which distance there is no bottom at 140 fathoms.

KIBLEEA, or JIBLEEA ISLAND, lies between 12 and 13 m. E. of Helahneea, its E. end being in the meridian of Ras Sherbedah. It is not more than 3 or 4 m. in circumference, and consists of several remarkably regular lime-stone peaks on its N., its E., and S. parts, the highest of which is 550 ft. above the sea; with comparatively low land near its S.W. point, which projects considerably from the main body of the island.

A dangerous rock bears E. by S. 3 m. from the E. point of the island; it dries at L. W. spring-tides, and has deep water close to it on all sides. There is a channel between it and Kibleea Island, with depths in it varying from 8 to 15 fathoms. There is also a rock above water called the Wall Rock, off the S.W. point, from which it bears S.S.W. distant $\frac{1}{2}$ m. Another, called Four-peaked Rock, so named from its outline, elevated about 100 ft. above sea, stands at $\frac{1}{2}$ m. to W.N.W. of the N. point of Kibleea; this rock has a ledge extending $\frac{1}{2}$ m. to the N.W. of it. The edge of the bank is between 1 and 2 m. S. of the island.

KIRZAWET, formerly called Ghurzoud, or Rodonda Island, the smallest of the group, is situated within the others, and bears N.E. by E. 6 m. from Ras Helahneea. It is not above a mile in circumference, but its conical peak is 230 ft. high. There are two rocks above water close to its E. point, and two sunken ones on its N.W. side, the soundings being deep all round it.

The bank of soundings in Kooria Moorla Bay, commencing at Ras Hasek, on the W., its edge curving a little to the N., and then continuing in a direction due E., passes within a mile or two of the Kooria Moorla Islands, all of which, except Kirzawet, are situated near the edge of the bank. The soundings in the central part of the bay are regular, varying from 30 to 40 fathoms, decreasing towards the shores and the islands. The bay is somewhat shoaler off its W. than its N. shore, averaging from 18 to 30 fathoms, 2 m. from the land. The quality of the bottom is in general sand and shells, or sand and coral, but occasionally rocky near Ras Gurwao and the islands.

Passages into the Bay. The W. passage into the bay between Cape Hasek and Haski Island is 15 m. wide, apparently requiring no caution, except when within a mile of Haski, where there is a rock which dries at L. W., as already described. The passage between Haski and Soda is 10 m. wide, the depths in the centre varying from 40 to 60 fathoms. The rocky bank, extending about a mile to the W. of Soda, appears to be the only danger. The entire width of the passage between Soda and Helahneea Islands is about 4 m., but the rocks off the W. end of Helahneea, reduce it to half that width. In 1820 or 1821, an English ship is said to have been wrecked in the night, when attempting to make this passage. There are from 12 to 20 fathoms in the clear passage; and the E. side of Soda, though rocky, may apparently be safely approached to within $\frac{1}{2}$ m.

The passage between Helahneea and Kibleea Islands is about 12 m. wide, with from 40 to 46 fathoms in the centre. It appears perfectly free from danger, except when near Kibleea, when the ledge, above noticed, off the Four-peaked Rock on its N.W. side, must be avoided. Kirzawet Island is situated about 6 m. inside this passage, and may apparently be passed with safety on either side within less than a mile.

In passing to the E. of Kibleea Island, the dangerous rock lying 3 m. off it must be avoided, the passage between it and the island appears quite clear, with depths from 10 to 16 fathoms. There are 180 and 170 fathoms of water $2\frac{1}{2}$ m. E. of the rock.

Tides. The flood-tide on the N. side of the islands runs to the W., and to the E. on their S. side. It is H. W. on F. and C. at 8 h. 20 m. Rise $6\frac{1}{2}$ ft. Variation, 1° W.

Currents. From Ras Furtak to Ras Noos, the currents often run against the wind during the N.E. monsoon; but, amongst the Kooria Moorla Islands, they are very fluctuating, and frequently set to the N.W., into the bay, rendering it unpleasant if becalmed close to these islands; it is, therefore, preferable to pass outside of them, unless when land and sea-breezes prevail near the coast, by which a ship may make progress against the monsoon, keeping near the land.

DESCRIPTION OF COAST (*continued from page 207*). The coast, from Ras Sherbadaht, trends nearly straight N.E. to Ras Saukirah for 28 m., a noble length of lime-stone cliffs, about 600 ft. high, quite steep to the water's edge, and with a table-top. It is bold to approach, having 20 fathoms water close to the cliffs, and no off-lying dangers, although it was formerly stated that "Ships ought to be attentive to the lead in approaching Cape Saugra, as reefs project from the shore near it."

The land about Ras Gurwao is white and level, like the North Foreland (but more lofty,) and destitute of any distinguishing marks; but to the N. of Cape Saugra, for about 7 leagues, the land becomes higher; from the latter cape the coast turns sharp round to the N., and forms an extensive bay. Between these capes there are soundings of 40 and 30 fathoms, within 2 or 3 m. off the shore; but farther out, with Cape Saugra N.N.W. about 4 leagues, and Ras Gurwao W. $\frac{1}{2}$ N., there are 20 fathoms rocky bottom.

RAS SAUKIRAH, in lat. $18^{\circ} 8' N.$, lon. $56^{\circ} 35' E.$, is a prominent bluff cape, 622 ft. above the sea, forming the S.W. extreme of Gubet Saukirah, and the N.E. brow of the tabular lime-stone cliffs which extend to Ras Sherbadaht, the whole line of which, when the sun shines upon it, has the appearance of clay cliffs. In standing toward the shore to the N., do not run far into the bay, where the water is shoal, only 10 fathoms when the cape bears about S.W.; but with proper attention, the lead will give sufficient warning, by showing a gradual decrease of depth.

Soundings. At 25 m. to the E. by S. from Ras Saukirah there is a coral bank, with from 21 to 27 fathoms; at 10 m. to the E. of it, the 100-fathoms line runs to the N.E., and in a S.W. direction nearly straight to the S.E. island of the Kooria Moorla group.

SAUKIRAH, or SAUGRA BAY is very extensive, being comprehended between Ras Saugra and Ras Madraka, 88 m. to the N.E. The W. coast of this great bay is low and apparently shallow, trending N. by E. from Cape Saugra about 35 m., and then E. by N. and E. for 20 leagues. This

immense bay seems to have no dangers of which the lead will not give sufficient warning. Arab pilots say it might be coasted in any depth from 4 or 5 fathoms and upwards. The bay was crossed in 9 fathoms, and its shores could not be seen in the bight from aloft; nor could there be seen the slightest appearance of vegetation or animation on any part of the shore, except at Cape Madraka, where there were a few huts and people. The surveyors found the shore all low and sandy throughout, thinly sprinkled with mangrove bushes. About 7 to 9 m. from the coast-line, there is a range of moderately-elevated tabular hills. During the N.E. monsoon, there is always a heavy swell and a high surf along the beach. The shoal spit, at 25 m. to the N.N.E. of Ras Saukirah, and called **Rejjat-ul-Jazir** (from the rippings over it,) has 1½ fathoms at its outer edge; but, as this is within the general 5-fathoms line, it can scarcely be called a danger.

Bunder Jezirat is a small bay with a sandy beach, about 1 m. to the S.W. of Tagiyat Abak, and to the E. of Ras Khashaim, which is a dark bluff, and slightly-projecting point, about 8 m. to the S.W. by W. from Ras Madraka. Bunder Jezirat is the frequent resort of Arab boats from the N., to procure sharks' fins and tails; which a few poor fishermen of the Jenebeh tribe collect along the shores of Gubet Saukirah. This bay, the bottom of which is mud and sand, shelters in the N.E. monsoon; but, if the wind should shift to S.S.W., and blow strong, as it does sometimes towards the latter part of the N.E. monsoon, a vessel should run round to the N. side of Cape Madraka.

RAS MADRAKA, called also by Arabs **Ras-el-Jezirat**, and by former navigators **Cape Isolette**, in lat. 19° 0½' N., lon. 57° 51' E., is high, and may be seen 15 or 16 leagues in clear weather, appearing like an island, hence its names of Jezirat and Isolette. To the W. of it there is some double table-land, about 2 or 3 m. in length; here the soundings are regular, 9 or 10 fathoms close in-shore. The high part of the cape has on its summit a remarkable rock, called Tagiyat Abak (Abak's Hat,) 333 ft. above the sea, resembling a building when viewed at a considerable distance, and when near, a low point terminating in a small rock is seen projecting 5 m. from the cape to the N.E.; this is generally called Low Point, or Ras-el-Jezirat (from the rocky island off it,) from which the coast, that had an E. direction on the W. side of the cape, now turns sharp round to N. by W.

Ras Murkas is a point of land 480 ft. high, in lat. 19° 10' N., lon. 57° 48' E., and 4 leagues N. by W. from Ras Madraka; the whole of this headland is composed of black volcanic peaks, with tabular hills in the back-ground, averaging 450 ft. in height above the sea. At 5 leagues farther N. is a low point called **Ras-el-Awani**; and thence at 4½ leagues to the N. by W. stands **Ras Kuerat**, as far as which point the coast appears clear, but outside are the San Carlos shoals, which render the passage inside Maseera difficult and dangerous. When a ship is 3 or 4 leagues to the N. of Low Point, the coast should not be approached nearer than from 12 to 18 m., on account of many dangerous shoals extending far out, from hence to the Island of Maseera.

GULF OF MASEERA. Ships ought to avoid this Gulf between Ras Madraka and Maseera Island, on account of its dangers, for it would be imprudent to run for the island in the S.W. monsoon when blowing strong, or at any other time when the weather is not clear, lest they should be set into the Gulf by the uncertain currents which at times prevail. This was experienced by the *Royal Admiral*, Captain D. Simmons, bound from the Strait of Sunda during the S.W. monsoon, which ship passed through between the island and the main, and was nearly lost; and many ships, in early times, have got into the Gulf of Maseera, when bound to the Persian Gulf.

The Gulf of Maseera is an extensive and deep bight or bay between Ras-el-Jezirat and Maseerah Island. The whole coast of the Gulf is very desolate, and thinly inhabited by small parties of the Jenebeh tribe, who subsist solely on fish. The Gulf should be avoided by ships passing up or down the coast, owing to the numerous dangerous coral patches and banks which exist within its limits, to be described hereafter. It has been generally supposed by navigators that there is a strong indraught or current setting into the Gulf, but during the survey by Commander A. Grieve, of the Indian Navy, in the *Palinurus*, no current was found to exist, except close in-shore. The tides in the vicinity of the banks set regularly N.N.W. and S.S.E. at the rate of 1 to 1½ m. per hour, which would not be felt by vessels passing up or down the coast. It would be advisable, however, for passing vessels to keep well clear of the banks, for currents may exist at certain periods which were not observed during the survey, executed during the N.E. monsoon. It is very certain that several vessels have been set into the Gulf and nearly lost, but most probably owing to want of due attention to the lead, not to a set of current. As there is ample room for soundings being taken between the outermost shallow banks and the edge of the bank of soundings, between which there is a distance of 16 m., common attention to the lead will prevent any vessel running into danger, and certainly such a disaster as befel the U.S. ship *Peacock* would be avoided. This vessel ran aground off Ras Zaiwari, to the E. of Gubet Hasheesh in Sept., 1835, and must have run over at least 40 m. of soundings before she struck.

The Gulf of Maseerah should certainly be *always* avoided, unless in cases of extreme necessity, as one of the most dangerous parts of the coast of Arabia. During strong winds there is always a heavy swell rolling in, and on many parts of the numerous banks the sea breaks heavily, which, in foggy or hazy weather, would render it difficult for a vessel to work out of danger after once getting into it.

Shab Kudoon, or San Carlos Banks. The dangerous portions of these shoals, lying from 13 m. to 25 m. to the N.E. by N. of Ras Murkas, consist of four or five separate reefs and sunken patches, with from 4 to 9 fathoms on them. The nearest patch bears E.S.E. 5 m. from Ras-el-Awani, and extends in the same bearing for 4 m.; the original *San Carlos* patch is about 5 m. to the N.E. of that. Captain Smith, with the convoy of store-ships, in working along the coast to the N., got on the S. part of these shoals, where they had great over-falls and shoal water, on some of the rocky patches. On one of these, the *San Carlos* ship had $3\frac{1}{2}$ and 4 fathoms, rock, with a point of land like the extremity of an island, Ras Kuerat, bearing N.W. 6 leagues; Ras-el-Awani bearing W. about 4 leagues; and Cape Madraka S.S.W., then in lat. $19^{\circ} 26' N.$

Shab-bu-Saifah Bank is another large shoal, with not less than 6 fathoms, about 7 or 8 leagues to the N.N.E. of Shab Kudoon; having its N. edge in lat. $20^{\circ} N.$, and its E. side in lon. $58^{\circ} 20' E.$; when off the S. part of this Bank, the mast-head look-out can see Jezirat Hamar (to the W.S.W.) and Jebel Sawir, at the S. end of Maseera Island (to N.E. by E.) It is a safe rule for a vessel not to shoal her water under 20 fathoms, when passing between Ras Madraka and Maseera Island. If wishing to enter the Gulf of Maseera, you may safely run in for Jezirat Hamar, on any bearing between W. and N.W. by W.

Jezirat Hamar-el-Nafoor, in lat. $19^{\circ} 48' N.$, lon. $57^{\circ} 48' E.$, is a white, rocky, lime-stone islet, only 3 or 4 cables across, but 320 ft. high, and visible about 20 m. from the deck of a large ship. Myriads of wild fowl frequent it and cover it with *guano*. Close to it, both on the E. and the W. sides, there are some sunken rocks. It bears from Ras Kuerat N.E. by N. $9\frac{1}{4}$ m., and is 3 m. off nearest land, the low rocky point of Serair, on an E. by S. bearing. The low, sandy point, with village and date-grove of **Ras Sidree**, lies 5 m. to N. by W. of this islet.

Ras Nakhrait, a bold, bluff point, 365 ft. above sea, stands about 11 m. to the N. of Jezirat Hamar; and 7 m. above Sidree, there is a steeper bluff (465 ft.,) shown mid-way on the chart, but without a name. Above Nakhrait the coast runs on nearly straight, and all sandy, to N. $\frac{1}{4}$ E., for 11 m. to Ras Surab; a range of hills, from 700 to 800 ft. high, rises abruptly at the back of this narrow, sandy shore.

Water. Fresh water is procurable at Surab; the fishermen are always willing to carry it off to a vessel at a reasonable charge. When running into this place, remember that the Shab-bu-Saifah and other shoals encumber the gulf to the S.E. of Surab.

Shab Ghabat Reef is a dangerous patch of breakers, $\frac{1}{4}$ m. long N. and S., but shoal water makes it 1 league in length; its centre is 9 m. to the E. by N. of Ras Surab; and from it Ras Mintot bears N., distant 8 m. A rocky bank, with $2\frac{1}{4}$ fathoms, lies 3 m. to the W. of Ghabat Reef.

Ras Mintot, at 18 m. to the N.E. of Ras Surab, is a low, broad, sandy point, separating Gubet Surab from Gubet Mintot. A rocky spit runs off the S. point of the cape for 5 m. to the S. by W., where 3 fathoms is found. The fair channel between this and Shab Ghabat is only 2 m. broad, with depths of 6 and 8 fathoms. **Jebel (or Karn) Shabatain**, a conspicuous peaked hill, 483 ft. above sea, standing 8 m. to W. of Ras Mintot, forms an excellent mark for the Shab Ghabat, from which the peak bears N.W.; but the chart is the best guide. **Ras Ahbana**, at 9 m. to N.E. of Mintot, is a low, rocky, projecting point, with a range of hills rising from it towards the W.; it forms the W. extreme of Gubet Hasheesh, the bottom of the Gulf of Maseera.

GUBET HASHEESH is a shallow bay, 7 m. wide by 12 m. in depth; with three islands in it. Jezirat Rahk and J. Mahot are near its N. part where it dries at L. W., and from the latter it dries out towards the S. to Jezirat Ahb, a low, rocky islet, which is nearly 6 m. to E.N.E. of Ras Ahbana; large vessels may anchor mid-way between these in 6 or 7 fathoms, muddy bottom; small vessels may go further in, to 4 fathoms, about mid-way between Ahb Islet and Ras Zakr, a point of the hills situated 4 m. to the N. of Ras Ahbana.

Supplies of good sheep, fire-wood, and fresh water may be procured at the village on Mahot Island to the N.E. of the last-named anchorage. This contains about 300 inhabitants of the Jenebeh tribe.

Shab Arzait is a patch of rocks, covered at H. W., bearing about E.S.E., and a little over $1\frac{1}{4}$ m. from Ras Ahbana. The channel between them, having 5 to 7 fathoms, is nearly 1 m. broad, the deepest water being near to the shoal. But there is a rocky bank, with 3 fathoms only, at 2 m. to the S.W. of Shab Arzait; vessels can pass between these, by keeping the pyramid hill (120 ft. high, 1 m. to N. of Ras Ahbana,) on a N.W. by N. bearing.

Ras Shijhrait, the E. point of Gubet Hasheesh, is a low, sandy point, with a small, rocky islet, which bears E.S.E., and is 7 m. from Ras Ahbana. The shoalest water is on this E. side of the Gubet, and it runs off from Shijhrait to the S. by E. for 10 m., where 3 and 4 fathoms are found, then rather abruptly dropping off into 12 fathoms.

Tides. It is H. W. on F. and C. at Gubet Hasheesh entrance at 10 h.; springs rise 10 ft. Flood sets to N.N.W.; ebb to S.S.E., about 1 m. per hour.

Fogs and Winds. Thick fogs are prevalent in the vicinity of Gubet Hasheesh and the Gulf of Maseera during the N.E. monsoon, which are borne down with great rapidity by sudden breezes from the N. The Belat winds are felt here from mid-Dec. to mid-March; they blow from N. and N.N.W., lasting from 1 to 3, and even 7 days. Their approach is indicated on the previous evening by a faint, hazy arch over the land, or by the wind veering and coming from land-ward, sometimes in sudden gusts, early in the night. They nearly always set in between midnight and 4 h. a.m., commencing with a light breeze, and increasing to a moderate gale in about an hour; blowing hardest between 9 h. p.m. and 9 h. a.m., and they usually cease about noon, as suddenly as they commenced. Close in-shore they are dangerous, as during the night they sometimes die away to a calm, which lasts an hour or so, then sudden gusts succeed each other for several hours. These gusts give no warning, except a rushing noise over the water at their immediate approach. Off shore, these winds raise a high sea; they are frequently succeeded by strong S.E. winds. About Maseera, S.E. winds are more prevalent than any other in Feb. and March. Fresh S. breezes, of 2 or 3 days' duration, are experienced occasionally in the Gulf of Maseera. From mid-March to end of April, the winds are light and variable along the whole coast; land and sea-breezes are felt in-shore. Then about the Gulf of Maseera and towards Ras-el-Had, N.E. winds become lighter, and S.E. and S.W. winds more frequent, till the S.W. monsoon sets in after mid-May.

BAR-EL-HAKMAN is the peninsular promontory between Gubet Hasheesh and Maseera Island. It is very low, sandy, and covered with bushes for many miles. At 6 m. to the S.E. of Ras Shijhrait, lies **Ras Zaiwari**, its S.W. point, and immediately at the back of this, and to the E., an extensive salt-water lagoon, called Khor Melh. **Ras Mashu**, the S.E. point of Bar-el-Hakman, lies 10 m. to the E. of Ras Zaiwari, and forms the W. boundary of the S. entrance to Maseera Channel.

Kinasat Hakman is the name given to the extensive shore-reef which begins on the E. side of Gubet Hasheesh by Ras Shijhrait; thence stretching off to the S., extending 6 m. to the S.W. of Khor Melh, about 4 or 5 m. to the S. of Ras Mashu (but shoal water of 5 fathoms extends fully 7 m. to the S. by W. of this cape,) but only 1 m. to the E. of the cape. It consists of dangerous coral patches, some dry at L. W. The low-land of Bar-el-Hakman is only just visible from the extreme edge of foul ground, but no part of Maseera Island can thence be seen. The N. part of Shab-bu-Saifeh Shoal lies about 12 m. to the S. by W. of this shore-reef. The detached shoal (9 fathoms,) which lies 9 m. to the N.W. of Bu-Saifeh, bears S.W. by S., nearly 20 m. distant from Khor Melh.

The **Coast-line**, above Ras Mashu, trends to the N.E. by N. and N.E. for 30 m. to **Ras Shanna**, a low, sandy point, in lat. $20^{\circ} 45' N.$, lon. $58^{\circ} 44' E.$, right abreast of the N. point of Maseera Island. The low and wooded island called Jezirat Mawal, lies 1 m. off shore, and at 3 m. to S.W. of the cape. An extensive reef, dry at L. W., projects from Ras Shanna for 4 m. to the E.S.E.; this is named **Bayat**, or **Rejiat Dimnah**, its outer edge passes about 3 m. to the S. of Mawal Islet, and thence about half-way to Ras Mashu. But shoal water over a sand-bank, with $1\frac{1}{2}$ or 2 fathoms, extends down the shore-side of the entire Maseera Channel, commencing from the E. point of Bayat Dimnah, and thence reaching to the Oyster Islets, which are about 8 m. to the E. of Ras Mashu, and a mile or two off Maseera Island.

Maseera Channel may be entered by large ships from the S.; but from the N., by small vessels only, as the greatest depth of water is only 3 fathoms there at L. W., abreast of Ras Half, the inner N. point of Maseera. Numerous blind channels exist thereabouts.

MASEERA, or MASIRAH ISLAND, is $34\frac{1}{2}$ m. long by 9 m. in breadth at its broadest part, containing nearly 200 square miles of surface, and lies N.N.E. $\frac{1}{4}$ E., and S.S.W. $\frac{1}{4}$ W. It is distant from the main land from 9 to 11 m.; and between them there are several islets, and numerous shallow banks and rocky patches, leaving only narrow navigable channels. At its S. extreme the island narrows to a sharp point, called Ras Abu-Rasas. The N. extreme is 3 m. broad, and rather of a convex form, having a hill on either extremity. The E. and W. coasts are irregular, forming points with small bays between. The soundings on the E. side of the island are irregular as regards distance from the shore, but increase gradually to seaward. There are several small shallow patches at a short distance from the shore. The bank of soundings at the S. extreme extends 10 m. S. and 8 m. E., and at the N. extreme 18 m. to the E.

The Island is quite barren and sterile, and produces no vegetation beyond two or three date

groves and a few pumpkins. There are a few wild animals:—gazelles, hyænas, jackals, and, it is said, wild asses. Copper ore, of a poor quality, exists near Jebel Sawir and Ras-el-Jezirat; at the former spot, remains of smelting furnaces are still extant, said to have been used by the Persians many years ago.

The population of Maseera island amounts to 600 souls, of the Jenebeh tribe, all miserably poor, subsisting chiefly on fish; rice or other grain being beyond their means. They possess no cattle. Fish is very plentiful all round the island, of very excellent quality. Sharks abound, and are caught for their fins and tails, which are dried and exported to Muscat for the Chinese market. Turtles are also very numerous, and one kind affords very fair tortoise-shell, which the natives export.

The staple articles of the island are shark fins, dried shark and seer-fish, and *dibbal*, or the horn of the inedible turtle. A good set of shark fins will sell for four or five dollars at Muscat, and the horn of a large turtle, if of good quality, from ten to eighteen dollars. The inhabitants of Maseera have four large baghalahs, twenty large badans, and thirty fishing boats.

Turtles abound between Maseera and the main land, but more particularly in the neighbourhood of Gubet Hasheesh, where they are said almost to swarm. There are two kinds, the edible, probably the *Chelone mydas*, and the inedible, *C. imbricata*, or hawk's-bill turtle, both common to the Indian ocean. They grow to much about the same size; one of the former, for which two rupees were given, weighed 266 lbs. The latter, or inedible turtle, as it is termed, from being much less fleshy and much less fat, yields the turtle-shell of commerce. They are caught by being turned on the back when they come on shore at night to lay their eggs, or harpooned in shallow water with a barbed loose spear-head fixed to the end of a long bamboo. The spear-head catches in their back, and having a small rope attached to it, the turtle is thus pulled on board. The inedible turtle is much scarcer than the edible one. The shell is taken off the carapace by lighting a fire under the latter; the carapaces of both species are used by the Arab fishermen for fire-places in their boats.

Ambergris is also sometimes found on the shores of Maseera, as well as on the opposite coast. This coast abounds in the sperm whale, and several other species of cetacea, and of course with myriads of cuttle fish and cephalopods of all kinds, on which the former feed. It is stated by the Arab fishermen that sharks are so fond of ambergris, that wherever there is a piece floating—for it is very light, being resinous—it is almost sure to be surrounded by several sharks gnawing at it.

The climate of the island is generally healthy. Thermometer ranges in the N.E. monsoon from 68° to 78° Fahrenheit. Rain is very unusual, but, judging from the enormous water-courses visible in all parts of the island, it must fall heavily at times.

Aspect. The island is generally of a hilly aspect, but low in the centre and at the northern extreme. The hills, at their summits, form into clusters of small peaks, the greatest elevation being only 700 ft., and the average about 400 ft. Approaching the island from the N. or N.E., the most conspicuous hill is Jebel Madthrub, a rounded hill on the northern range, elevated 620 ft. above the level of the sea, standing amid a cluster of lesser hills, one of which is called Sharp peak, from its peculiar form. Nearly all the hills are of volcanic formation, except some table-land in the vicinity of Ras Yee. The island is barren and sterile, with the exception of two or three date-groves.

RAS ABU-RASAS, the S. point of the island, in lat. 20° 10' N., and lon. 58° 38' E., is a low, rocky, sharp point, having a conspicuous conical hill at 1½ m. to N.N.E. of it, called Alamtain by native navigators, and Jebel Saweer by the islanders.

Dangers. About ¼ m. to S.S.W. of the point is a small, dangerous patch of breakers, with 5 and 6 fathoms water between it and the point, called Shab Abu-Rasas. A coral shoal, with 4 and 6 ft. water over it, extends from these breakers 1½ m. to the W., called Shab Matrai. E. by S. from Shab Abu-Rasas, and distant 1½ and 2½ m., are other two shoal banks, the nearest having 2 fathoms water on it, and the other from 4 to 6 fathoms, with from 10 to 13 fathoms water between them. The sea frequently breaks on all these banks; the S. point of the island should, therefore, not be approached under a distance of 2 m.

The E. coast runs from Ras Abu-Rasas N.E. for a distance of 11 m. to Ras Kaida, forming small rocky points with sandy bays between, the hills rising abruptly from the beach in thick clusters. The shore is bold to approach, and no dangers exist till off Ras Kaida. There are 5 fathoms water within a mile of the shore, and the edge of the bank is from 6 to 4 m. distant. **Ras Dtharri** is a projecting rocky point, 6 m. to N.E. by E. of Ras Abu Rasas. **Ras Kaida**, 5 m. further to N.E., is a small, projecting, rocky point, which may be easily known by a black, double-peaked hill, rising close to it.

A Coral Bank, with 4 to 7 fathoms water over it, and 8 to 11 fathoms between it and the shore lies 1½ m. to E. from this point. This bank is very deceptive: when the sea is smooth

there is no indication of shoal water; but, on the slightest swell rising, the sea breaks heavily on it. Vessels should, therefore, particularly avoid anchoring on it, or on any of the shallow banks round the island. The depth of water on these banks is probably decreasing, as all are of coral formation.

The E. coast, from Ras Kaida to Ras Zafarnat, a distance of 17 m. in a N.E. by N. direction, forms a slight curve, with a low, rocky beach. The coast line is regular, only one small sandy point occurring between the capes. The shore is bold to approach, there being no danger. The bank of soundings extends 10 m. to the S.E. **Hakkan**, a small village, is situated in a date-grove close to beach, and 5 m. to N. from Ras Kaida. The island at this part is only 4 m. across, forming low, undulating hills. Fresh water is procurable at the village of Hakkan, also a few pumpkins. **Ras Zafarnat** is a rocky point (from which the hills rise abruptly towards Jebel Madthrub), and bears from Ras Yee S.W. by S. distant 2 m.

RAS YEE, or JEE, the E. point of the island, is a bluff point, formed by a ridge of hills from the centre of the island, of which Jebel Madthrub (4 m. to W.N.W. of Ras Yee) is the most elevated and conspicuous, being 620 ft. above the sea, and obtuse in form.

The soundings off this point are 15 fathoms, at 1 m. distant, and 22 to 25 fathoms at 2 m., the edge of the bank being 10 m. off shore. **Ras Yee** is in lat. $20^{\circ} 32' N.$, lon. $58^{\circ} 58' E.$

Ras-el-Jezirat is a rocky point $3\frac{1}{2}$ m. to the N.W. of Ras Yee, between which two points the shore is rocky, but free from danger. It derives its name from a small, sandy islet, lying close off it to the N. The cape is prominently marked by a small, black cove. From Ras-el-Jezirat the coast forms a slight curve or bay with Ras Jidoof, which bears from the former N. $\frac{1}{4}$ W., $7\frac{1}{2}$ m. In this bay is a rock just awash at L. W., $1\frac{1}{2}$ m. from the shore, bearing from Jidoof hill S. by E. $\frac{1}{4}$ E., and from Jebel Madthrub N.N.E. $\frac{1}{4}$ E.; close round the rock the depths are 3 and 4 fathoms. The other soundings in the bay are regular, there being 7 fathoms water 2 m. off shore, decreasing gradually towards it. The edge of the bank of soundings is about 18 m. to the E. of Ras Jidoof.

RAS JIDOOF, the N.E. extreme of the island, in lat. $20^{\circ} 42' N.$, and lon. $58^{\circ} 55' E.$, is a rocky point, having a hill of the same name rising immediately behind it. Off the point a rocky reef extends $\frac{1}{2}$ m., with shallow water on its edge; the point should, therefore, not be approached under 1 m. **Ras Half**, the N.W. point of the island, is a low, sandy point, to the S. of which, at a distance of $1\frac{1}{2}$ m., is a moderately-elevated black hill, bearing the same name. The coast between the two capes is slightly convex, and fronted by several patches of rocks, dry at L. W., extending from $\frac{1}{2}$ to $\frac{1}{4}$ m. from it.

Shoals. From N. by W. of Ras Half to N. by E. of Ras Jidoof, and distant from the shore from 3 to 5 m., are five shallow patches, with only $2\frac{1}{2}$ fathoms water over them, the soundings between them and the shore being from $3\frac{1}{2}$ to 4 fathoms, at L. W. of spring tides. The fair channel is between these shoals and Ras Half. From these shoals off the N. part of Maseera, a bank of foul ground extends to the main land, and as far to the N. as Ras Shebali, with soundings of from 2 to 4 fathoms on it, on which the sea rolls heavily during the N.E. monsoon, rendering the coast to the S. of Shebali unapproachable, except in small boats.

Coming from the N., to clear the foul ground extending from the main land, Jebel Jidoof should not be brought to bear to the S. of S.S.W. If running down the coast in pilot water (say 15 fathoms), you should suddenly shoal to 6 or 5 fathoms, to the N. of Maseera Island, and before its hills are seen, you will know that you are running into Maseera Channel, and must haul out at once to the E. and S.E. for a mile or two, to avoid the above shoals.

Kinasat Half is a shoal, partially dry at L. W., bearing W. $\frac{1}{4}$ S., distant $1\frac{1}{2}$ m. from Ras Half, with soundings between of from 3 to 7 fathoms. Between it and the great reef Bayat Dimnah (see page 212), the depth is $1\frac{1}{2}$ fathoms, sandy bottom.

The W. coast, from Ras Half, runs to the S.S.W. as far as Ras Shakaf, a distance of 9 m., forming a slight curve, the bank off which dries at L. W. to $\frac{1}{2}$ m. or $\frac{3}{4}$ m. from H. W. mark, and rocky, foul ground, extends off shore 1 to 2 m. From Ras Shakaf the coast turns more to the S. to the chief town, Ohm Rasas, a distance of $8\frac{1}{2}$ m., when it curves to the W. for 3 m., forming a bight of that depth. In this bight lies the low, sandy island, called Jezirat Shagha, which cannot be approached within $1\frac{1}{2}$ m., on account of a bank, which dries at L. W., and extends from it in all directions, meeting the S. shore of the bight, leaving a narrow channel between it and the shore, with depths of from 1 to 3 fathoms water. Close to the W. edge of this bank there are 6 fathoms water. **Dauah** is a small village, situated close to the shore in a grove of date-trees, and 2 m. N.N.E. of Ras Shakaf. Good water may be obtained at the latter. Anchor 1 to $1\frac{1}{2}$ m. off shore in 4 to 5 fathoms water.

N. END of MASEERA CHANNEL. Jezirat-ibn-Jooaism is a small islet, lying $2\frac{1}{2}$ m. from the Maseera shore, and on the E. edge of the extensive shoal, Bayat-ibn-Jooaism, which is $6\frac{1}{2}$ m.

long by 3 m. broad, and mostly dry at L.W., lying midway between Ras Shakaf and Bayat Dimnah. The N. edge of this shoal is $1\frac{1}{2}$ m. from Kinaset Half, with a channel between of 2 to 4 fathoms water. On either side of the shoal is a navigable channel, meeting at the S. extreme; the E. one (formed between the foul ground off Maseera and the shoal) being the narrowest, and only $\frac{1}{2}$ m. wide at its N. entrance; the W. channel, formed between the shoal and the extensive bank, Bayat Dimnah, is $1\frac{1}{2}$ to 3 m. in width. At $\frac{3}{4}$ m. to S. of Bayat-ibn-Jooaism, there is a small shoal patch of 2 fathoms water.

The depths in the E. channel are $2\frac{1}{2}$ fathoms at the N. entrance, to 4 and 5 fathoms at the S. part. In the W. channel the water is deeper, there being from 4 to 5 and 6 fathoms.

At the S. end of Bayat-ibn-Jooaism, the channels join and form into one, being bounded on the E. side by the rocky ground off Maseera, and on the W. by the bank of foul ground which extends from the main land, and terminates at Jezirat Sifah, which islet lies $2\frac{1}{2}$ m. to the N. of Ras Kalban, and is the most N. of the Oyster Islets. The depths of the channel are from 4 to 6, 7, and 8 fathoms, and the width from $1\frac{1}{2}$ to 2 m.

At 6 m. to the W. of Ohm-Rasas, and on the edge of the W. bank of the channel, there is a dangerous, **sunken rock**, with only 2 ft. water, called Hassar Walad Henal, which must be carefully avoided. From it Jebel Kairan bears S. $\frac{3}{4}$ E., and Jebel Safajj is in one with the S. point of Jezirat Shagha. The fair channel is thereby made less than 2 m. wide.

OHM-RASAS is the chief town of the island, and the residence of the Sheikh; its population, together with Safajj, a village contiguous to it, is about 300 souls, who carry on a trifling trade with Muskat. The town is protected in front by the low island, Jezirat Shaga, before mentioned, which cannot be approached within $1\frac{1}{2}$ m., on account of the shallow bank extending from it in all directions. A small creek runs in between the island and the shore, by which boats can get close up to the houses. From the islet, the opposite coast of the main land is not visible.

Tides. It is H.W. on F. and C. at the town of Ohm-Rasas at 10 h.; rise of springs 10 ft. The flood sets W. round the N. point of the island, and S.S.W. down the channel; round the S. point the flood sets W.N.W. and N.N.E. up the channel, meeting off the town. The ebb tide sets fair the contrary way to the flood. Velocity of tides varies from $1\frac{1}{2}$ to $2\frac{1}{2}$ m. per hour.

The coast, from the W. point of Ohm-Rasas Bay, runs S.S.W. $\frac{1}{2}$ W. to Ras Kalban, being rocky and irregular, forming small, projecting points, and fronted by a rocky bank, and some rocks above water, extending $\frac{3}{4}$ m. from the shore, and should not be approached under 1 m. **Ras Kalban** is a low, rocky point, with a sandy beach on either side of it, from whence the coast takes a turn to the S.

Jebel Safajj is a conical hill, close to the S. of the village of that name, with the remains of a fort on the summit. **Jebel Kairan**, or Saddle Hill, is a remarkable double-peaked hill, elevated 385 ft. above the sea, situated 1 m. from the beach, and nearly 4 m. N.E. from Ras Kalban.

OYSTER ISLETS. To the N.W. of Ras Kalban are three small, rocky islets, known as the Oyster Islets, from their being covered with that fish. Between the N. islet, or Jezirat Sifah, and the next (which bears S.W. by S. from it, distant 2 m.), are two patches of sunken rocks. The S. islet is named Ohm-Kads; it lies exactly 1 m. to W.N.W. of Ras Kalban.

Zanatiyat Rocks. S.W. by W. from Ras Kalban, and distant from 2 to $3\frac{1}{2}$ m., is a dangerous group of rocks, called Zanatiyat, with soundings close round them of from 5 to 7 fathoms.

The coast from Ras Kalban runs nearly S. to **Ras Abu-Rasas**, the S. point of the island; it is low and sandy, and forms several low, projecting points. Close to the shore, at $1\frac{1}{2}$ m. from the S. point, are two small islets, and $1\frac{1}{2}$ m. farther N. are three more islets, running in a direct line from the coast to the W., off which are some sunken rocks, extending altogether nearly $1\frac{1}{2}$ m. from the shore: the whole are collectively called Banat Marshid. Again, at $2\frac{1}{2}$ m. to the N., is a small, rocky patch, lying close to the shore. Kalban is a small village, situated on the shore, and distant $4\frac{1}{2}$ m. from the S. point of the island, and about 6 m. to the S. of Ras Kalban.

Shah Sanfar is a rocky shoal, just awash, bearing W. $\frac{3}{4}$ N. from Jebel Saweer, and distant from the shore $2\frac{1}{2}$ m. It is $\frac{3}{4}$ m. long, N. and S., by $\frac{1}{4}$ m. in breadth.

S. END of MASEERA CHANNEL. The W. shore of Maseera Channel from Ras Mashu is low and rocky, with intermediate sandy patches, until within 11 m. of Jezirat Mawal, where the extensive reef, called Bayat Dimnah, commences: thence it is low and sandy as far as Ras Shanna.

Directions for sailing through Maseera Channel. Coming from the N.E., steer for Jidoof hill, taking care not to bring it to bear to the S. of S.S.W.; when within 1 m. of the point, haul to the W.S.W., to clear the shoal ground extending from it; then to S.W., keeping about $\frac{3}{4}$ m. off shore, and round Ras Half, at $\frac{1}{4}$ to $\frac{1}{2}$ m. distant. After passing Ras Half, steer S.W. by S., to cross over the shoalest ridge. On bringing the black hummock, Jebel Half, to bear E.N.E., the water will probably shoal to $2\frac{1}{2}$ fathoms, increasing again to 3 and 4 fathoms as the islet on the W. shoal,

Bayat-ibn-Jooaism, is approached, which may be passed at little more than $\frac{1}{4}$ m., the channel here being $\frac{1}{4}$ m. in breadth. Proceeding on the same course, the channel becomes much wider, and when off the village of Dauah, the shore may be approached to $\frac{1}{4}$ m. From Dauah, a course S.W. $\frac{1}{4}$ S. will lead clear abreast the town, 'Ohm-Rasas, off which a vessel may anchor in 5 to 6 fathoms, water, with the round tower bearing E.S.E. to E. by S., and distant $3\frac{1}{4}$ m., whilst Jezirat Shāgha lies $1\frac{1}{4}$ m. to the S.E.

If the weather is clear, the line of the shoals is generally well defined, and little danger or difficulty would be experienced, except to the N. of Jezirat-ibn-Jooaism, where the greatest depth appears to be $2\frac{1}{4}$ fathoms, and the channel very narrow.

Another channel, much broader and deeper, leads to the N. and the W. of Bayat-ibn-Jooaism; but the E. channel, being the most direct, is perhaps the preferable one. To pass through the N.W. channel, proceed round Ras Half, as before directed, until the black hummock bears E. $\frac{1}{4}$ N.; keep it on that bearing until Jezirat-ibn-Jooaism is only $\frac{1}{4}$ point open to the right of Jebel Mad-thrub. Jebel Kairan, or Saddle Hill, will then bear S. by W., which, kept on that line of bearing, will lead down clear to the anchorage off the town, as before stated.

The channel abreast the town is 2 m. wide, increasing in width to the S.; the E. side is bounded by the bank of rocky ground, with some rocks above water, which extends from the shore of the island, and should not be approached under $\frac{1}{4}$ to 1 m. The opposite side of the channel is bounded by a sand-bank, with $1\frac{1}{4}$ to 2 fathoms water on it, and very steep-to. The soundings in the channel vary from 5 to 7 fathoms.

Proceeding to the S. from abreast the town, steer S.W. by S., and when the S. islet of the Oysters, Jezirat Ohm-Kads, is seen, keep it on that line of bearing until near, and pass it on either side, as most convenient, at $\frac{1}{4}$ m. to $\frac{1}{2}$ m.

After passing Jezirat Ohm-Kads, keep it bearing N.E. by E., to avoid the dangerous group of rocks, Zanatiyat, until Jebel Saweer bears S.E. by S., when a vessel will be clear of them, and may steer S., keeping a good look-out for Shāb Sanfar, a rock just awash, bearing from Jebel Saweer about W. by N., and nearly 4 m. to N.W. by W. from Ras Abu Rasas.

Entering the Channel from the S. In the S. entrance the soundings are from 7 to 9 fathoms, sand and coral, with occasional over-falls. Ras Abu-Rasas should not be rounded under a distance of 3 m., and a vessel should be 3 m. to the W. by S. of that S. point before standing to the N. by W. After Jebel Saweer bears E. by S., she may haul up for Ras Kalban N.N.E., to pass inside the Zanatiyat rocks; or outside of them, by steering N. by W., till Ohm-Kads bears N.E. by E., when she may steer for that islet, and pass it as before, on either side. After which the above directions reversed will serve to guide a vessel through.

The channel is decidedly very unsafe for general navigation, and the passage should never be attempted, except under the pressure of extreme necessity. The channels are very narrow in some places, and entirely destitute of good leading marks to guide a vessel through. The chief, or sheikh, of the island also has always displayed the greatest repugnance to the presence of European vessels in those waters; and any defenceless vessel falling into his hands would probably meet with anything but good treatment. The channel is little frequented by native vessels of more than 30 or 40 tons burthen.

THE COAST. Ras Shebali, on the main land, is a low, rocky point, with some bays on the N. side; the point bears from Ras Shanna N. by E. $\frac{1}{4}$ E. 13 m., the coast between being very low and sandy, with bushes. As before stated, a bank of foul ground, with from 2 to 4 fathoms water on it, extends from Ras Shebali to the island of Maseera, on which the sea rolls heavily during the N.E. monsoon. About a mile inland from the cape, is the village of Shebali, containing about 200 inhabitants of the Whebah tribe.

The Whebah have but few boats, and being very poor, are obliged to have recourse to the inflated sheepskin, called *Kirbah* (vulg. *giri*). It is commonly used by the inhabitants of this coast from Ras Roos to the village of Hasek, in Kooria Moorla Bay. But with the poor Whebah its use is seen in perfection. As soon as a shoal of fish is viewed from the heights by those who are watching for them, the fishers assemble, and seizing their skins and casting nets, rush to the water's edge. Here the skin is quickly soaked and inflated, after which the hind and fore legs are tied together with a string. Thus prepared they step into the ring; and, slipping the skin up towards the lower part of the stomach, throw their casting-nets across the left shoulder, and wading into the water up to their necks, sit upon the string, which rests against the back part of their thighs; and thus they paddle away with hands to the place where the fish are. In this way as many as twenty at a time will enter the water and swim out to a distance of 2 m. When they have arrived among the fish, they throw their casting-nets, and gathering them up, return to the shore with what they contain, having no means of securing the fish on the spot.

The coast from Ras Shebali runs N.E. 43 m. to Ras Jibsh. For 13 m. the land rises in cliffs of from 30 to 70 ft. elevation, with sandy spaces intervening; after which it presents an unvaried line of low sandy downs, without the slightest trace of vegetation or inhabitants. A heavy surf beats on the shore, rendering landing impracticable in ships' boats. The coast as far N. as Ras Jibsh is inhabited by the Beni Jenebeh tribe, who bear a generally bad character, it is therefore not safe to land. They are all *wreckers*, and consider everything that strands on this coast the property of the tribe to whom that part of the coast belongs. They are probably the worst characters on the coast.

The bank of soundings extends off shore 30 m. at Ras Shebali, decreasing to 13 m. off Ras Jibsh, the 100-fathoms line being at those distances. The soundings are regular, the 20-fathoms line being $3\frac{1}{4}$ m. off Jibsh, increasing its distance to the S. The shore may be safely approached in any part into 5 fathoms, water.

RAS JIBSH is a small, and slightly projecting sandy point, having immediately over it a hill about 100 ft. in height, nearly covered to the summit with white drift sand; three little dark peaks, of which the hill is composed, showing above the sand. On the centre peak are the remains of an old tower. On the S.W. slope of the hill near Ras Jibsh is a small village containing about 60 inhabitants. On the N. side of the point is a small bay, affording a good landing-place in S. winds, but much exposed to N.E. winds. In clear weather Jebel Jahlan, 3,900 ft. high, may be seen when off Ras Jibsh: in appearance it approximates to a tongue-form, the high bluff being towards the E.

The **COAST** from Ras Jibsh to Ras-el-Khabbeh, a distance of 53 m., trends in a general N.N.E. $\frac{1}{4}$ E. direction; it is all low and sandy, and of an uniform desolate appearance, with several small isolated hills near the coast, one of which, Jebel Jifan, is of round form. The country bordering on the sea between Ras Jibsh and Ras-el-Had is styled El-Sharkiya, or the E. country, and forms no portion of the province of Ohman, which lies contiguous to it on the W. near the coast. It is entirely destitute of vegetation, but in the interior is diversified with extensive date-groves and running streams, with small patches of cultivation, chiefly jowari and cotton. The inhabitants of the coast between Ras Jibsh and Ras-el-Hadd, are of the Beni-bu-Ahli tribe, and are friendly to Europeans.

The bank of soundings decreases in width above Ras Jibsh, and at Ras-el-Khabbeh the 100-fathoms line is only 2 m. from the coast, and the 20-fathoms line 1 m. off, the lead therefore affords little guide. The soundings throughout are regular, and the coast may be approached in any part within a mile in safety.

El-Ashkhareh, or Lashkhareh, is a long straggling town and fort, 72 m. from Ras Jibsh, containing about 1,000 inhabitants of the Beni-bu-Ahli tribe, who have several boats. The country in the neighbourhood is a perfect desert, and affords no supplies, beyond a few goats and fowls. In Oct., 1820, a small British force was here defeated by the Arabs. **Jebel Seyhah**, an oblong black hill, several hundred feet high, bears W.N.W., 6 m. from Lashkhareh, with a conical hill a short distance to the N.E. of it. When seen bearing W.N.W., it forms a saddle-hill, and is a good leading-mark for making the place.

Ras Gomeleh is a low sandy point, 17 m. S.S.W. of Ras-al-Khabbeh, backed by a ridge of low hills, one of which, Jebel Gomeleh, is of conical form, not easily discernible from the N.E. **Ras Roos** is a low rocky point with a few sandy hillocks on it, bearing S.W., 3 m. from Ras-el-Khabbeh. Here is a village containing about 300 inhabitants, of the Beni-bu-Ahli tribe. In 1830, the *Oscar*, and in May, 1852, the *Centaur*, English merchant vessels, were wrecked a few miles S. of this cape. Both were plundered by the Bedouins, who consider any ship coming ashore upon their coast as their property. No one in these ships was injured; and a boat, belonging to the Beni Jenebeh, took the crew of the *Centaur* to Muscat.

Anchorage. The bay between the two points affords tolerable shelter from N. winds; and anchorage in 6 fathoms, with Ras-al-Khabbeh bearing N.E. by N., and Jebel Jahlan W.

From 2 to 4 m. to the S. of Ras Roos there is a coral bank, with from 7 to 10 fathoms water on it in over-falls.

Ras-al-Khabbeh is a low rocky point. Here the sandy shore terminates, and cliffs of from 60 to 100 ft. in height extend with but few short breaks to within 3 or 4 m. of Ras-el-Hadd. All this part of the coast is very bold, with no safe anchorage. When 20 m. below this point, the high mountains of Kalhat will be seen towering behind **Jebel Jahlan**, which conspicuous mountain is 20 m. inland, to the W. of Ras-el-Khabbeh, and elevated 3,900 ft. above the sea. At its S. slope are the chief towns of the Beni-bu-Hassein and Beni-bu-Ahli tribes. In clear weather this mountain may be seen at a distance of 60 m. **Jebel Kems**, a mountain at 20 m. to the W. by S. of Ras-el-Hadd, and 2,700 ft. above sea, is a rugged peak of dark colour, and is seen to the right of Jebel Jahlan when off Lashkhareh.

RAS-EL-JINEYZ, the E. point of Arabia, in lat. $22^{\circ} 26' N.$, and lon. $59^{\circ} 50' E.$, is a low cliff, the soundings off which are as deep as at Ras-el-Khabbeh, and there is a depth of 800 fathoms only 5 m. from the land. From it Ras-el-Khabbeh bears $S \frac{1}{4} W.$, 12 m., and Ras-el-Hadd, bears $N.$ by $W. \frac{1}{4} W.$, 7 m.

Jebel Safanat, called also **Jebel Fanoos** by Arab navigators, are two remarkable hills close together, of equal height, elevated 850 ft. above sea, close to the shore, at Ras-el-Jineyz. They are quoin-shaped, with the steep side to the $W.$, and stand on a table-land 100 ft. in height. Being isolated and close to the E. point of Arabia, they are very good land-marks for that cape; and when the comparatively low land thereabouts is below the horizon, they appear from the $N.$ or $S.$ like an island with a deep notch in it. They are visible above 80 m.

RAS-EL-HADD, or RAS-AL-HED. The low cliffs of Ras-el-Jineyz sink into a low sandy shore 3 m. below the N.E. cape of Arabia, Ras-el-Hadd, which is a very low sandy point, with a few date-trees; the little town of El-Hadd, lying 1 m. S.W. of it. The town consisted, in 1848, of two round towers and a number of mat-huts, and contained about 700 of the Beni Ghazal tribe. It is subject to the Imam of Maskat. The authority of that prince, S. of this point, is quite nominal. Indifferent water may be had abreast a small clump of date-trees at 2 m. to the $S.$; and bullocks and goats may be had at the town. To the $N.$ of this cape no soundings are to be obtained more than $\frac{1}{4}$ m. from the shore; to the $E.$ the bank of soundings extends about 3 m., and the 20-fathoms line is 1 m. off shore. This bank is famous for large fish.

The best anchorage in the N.E. monsoon, is with the town of El-Hadd bearing $W.$ in 8 to 10 fathoms, water, coral bottom, $\frac{1}{2}$ to $\frac{3}{4}$ m. off shore. This is exposed to all winds from the sea. The people of the town are civil, as is the case at all the towns $N.$ of this. In the S.W. monsoon, a vessel might anchor off El-Hejreh or Jerameh.

Currents round the cape are strong and variable, depending on the variable winds.

Challenger Bank. On Aug. 9th, 1880, at 1.30 p.m., discoloured water, with rippings, was observed from H.M.S. *Challenger*, in $22^{\circ} 29' N.$, and about 40 m. E. from Ras-el-Hadd. On sounding, two casts of 18 fathoms water were obtained, and soon after no ground at 65 fathoms, the sea having resumed its natural colour. The bank appeared 3 m. long by $\frac{1}{4}$ m. broad. Having been observed so shortly after noon, the position given is probably correct. The *Palinurus*, while surveying the coast, made diligent search for it, but without success.

The Coast above Ras-el-Hadd changes its direction to an average of $W. \frac{1}{4} N.$ for 15 m., to the town of Soor, or Sur. From Soor it sweeps gently round to the N.N.W., to Ras-as-Shijr, the mountains, **Jebel Kalhat**, descending precipitously to the sea, with very deep water close to the shore. Cliffs recommence 2 m. W. of the cape, and extend uninterruptedly for 6 m. Ras Sherh is a slightly projecting point of the cliff, 8 m. W. by $N.$ of Ras-el-Hadd; from this point to Soor, there is a ridge of low broken hills with patches of cliff. There is no danger on the coast between Ras-el-Hadd and Ras-as-Shijr. Between Ras-el-Hadd and Soor, the 100-fathoms line is at an average distance of 3 m. from the shore; and, from a few miles above that place, to 10 m. $N.$ of Ras-as-Shijr, the bank of soundings is only $\frac{1}{4}$ m. broad.

Khor-el-Hejreh is a small and shallow inlet used by small fishing-boats. Its entrance, between two low cliffs, is 2 m. W. by $S.$ of Ras-el-Hadd. There are 2 fathoms, water, at the entrance, shoaling gradually as the basin is approached. The inner half is dry at $L. W.$ Its direction is $S.$ for $\frac{1}{4}$ m., then $E.$ 1 m., reaching close to the back of El-Hadd Village. At the E. extremity of this khor are a number of ruins, and among them a large square building of modern construction, forsaken, and also in ruins. There is also a little jetty or wharf at the E. end, which served as a landing-place when (according to tradition) the khor was much deeper than it is at present. The ruins do not appear to be the remains of buildings of any consequence, although they are said to be those of a very large town.

KHOR JERAMEH, or BUNDER JERAHMI, the entrance to which is $1\frac{1}{4}$ m. to the $W.$ of the last, is a fine basin with a tortuous entrance 1 m. long and only 150 yards broad, between cliffs 60 ft. high. The inside basin, or **Refuge Harbour**, is $2\frac{1}{4}$ m. in length, in a $N.W.$ and $S.E.$ direction, and 1 m. in breadth. The depths are 7 to 9 fathoms, with a muddy bottom, in the entrance channel, and $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms, sandy bottom, just within it; shoaling quickly to 2 and 1 fathom as the $S.$ shore is approached, which is low with a mangrove swamp, and an isolated black hill close to it. It is used by native vessels as a harbour of refuge only, there being no village on its shore, nor is any water procurable. A town once existed on the S.W. side of the khor, but it is said to have been abandoned for want of water. At the end of Oct., 1846, the *Palinurus* found thirty-five baghalaahs waiting here till the autumnal squalls (called Leheyamah by the Arabs) were past. **Bunder Jerahme** might prove a valuable refuge to a vessel disabled in a N.-Easter, if she was going $S.$, but could not weather Ras-el-Hadd.

Tides. It is H. W. at F. and C. at 9 h. 30 m.; springs rise 10 ft. Velocity of tides in the narrows, 2 m. per hour.

Directions. This natural harbour* may be found useful to a steamer requiring smooth water to repair damages. Entering this place with a Northerly wind, keep close to the E. shore, till past the small shoal, of 2 fathoms at L. W., on the W. side at $\frac{1}{2}$ m. within the entrance; then keep in mid-channel, and pass on either side of a small island dividing the passage at the mouth of the basin—the E. channel is preferable, being more direct—and anchor as soon as past the island. Flaws of wind are of course prevalent in the entrance, vessels should therefore be prepared with a stern anchor in case of accident.

SOOR, or SUR, is a large town, or rather two towns situated on a khor or back-water; there are also two forts surrounded by huts to the W. of it, all included under the general denomination of Soor. The total number of inhabitants may be 10,000. The town on the E. bank, called Hejah, is inhabited by people of the Beni-bu-Ahli tribe; the other, Uhm Kreimtain, by the Beni Jenebeh, who are often at feud with each other. The S.W. fort, El-Heis, the larger of the two, is for the protection of the wells; and the Sultan of Muscat maintains a garrison there.

When on with Soor Creek, Jebel Kems bears S.W. by S., this may be useful as a guide to find the place. Just N. of Soor, the bank of soundings is only 1 m. wide.

Cattle and vegetables might be obtained here, but it is doubtful if any water could be spared for a ship. A large trade is carried on between this place and India, Zanzibar, Berbereh, and the Persian Gulf in baghalahs, and numberless fishing-boats which frequent the whole coast of Arabia, besides several fishing-boats which belong to the place. The trade is principally confined to imports, the only exports being dried dates and salted fish. They manufacture a coarse-checked cloth for turbans, &c. Many Banyans, natives of Kutch, are settled here, and the trade is very much in their hands. The Soor people are bold sailors.

Anchorage. A ship should anchor off the town in 10 to 15 fathoms water, sandy bottom; it is quite an open roadstead, and has not been surveyed. The khor is extensive, but narrow at the entrance, with a bar having only 3 ft. on it at L. W.; within are 2 or 3 fathoms water. Little can be seen of Soor town from the sea, the two forts are on higher ground, and first seen.

The Coast above Soor goes on curving gradually round to N.W. and N.N.W., for more than 30 m., till at Ras-es-Shijr it runs nearly N.; from this point it turns back to N.W. Soundings are not obtainable at more than $\frac{1}{2}$ m. off shore along this coast. The precipitous mountains, Jebel Kalhat and Jebel Beni Jabar, come close down to the sea. These mountains are in two ranges, one behind the other; both sinking into the plain together just above Soor; they have a regular outline. When viewed at a great distance from the N., the S. extreme of these mountains has been mistaken by strangers for Ras-el-Hadd. The coast-range averages 4,500 ft.; the back-range is higher, probably 6,000 ft. Above Ras-es-Shijr they recede from the coast for 20 m. in a W. by N. direction, ending at the Wadi Heil-el-Ghaf, called by seamen, the Devil's Gap. To the N. and W. of this Gap there stands another range, about 6,000 ft. high, called Jebel Fatlah (by some, Jebel-az-Zahtri). These ranges are sometimes visible 80 m. When the Wadi Heil-el-Ghaf bears W.S.W., it is quite open, and forms a remarkable land-mark; it is discernible on any bearing between W. and S.W. by S. Sometimes, when the mountain tops on both sides are covered with a streak of dark clouds, forming a sort of bridge over the Gap, the sky is seen clear through underneath, and the sunset scene is remarkable.

Winds. Squalls or heavy gusts blow at times out of this valley in the winter months, Jan., Feb., and March; they will lay a vessel on her beam-ends, if unprepared, but generally they give sufficient warning. The S.W. monsoon is not felt along this coast to N. of Ras-el-Hadd; at that time, calms and light winds prevail, sometimes light S.E. winds, with a drain of current to N.

In the winter, strong breezes are also experienced from N.E., called Nashi: they are attended by dark cloudy weather, and generally rain. The barometer stands high during these breezes, just as with similar land-winds on the Sind and Cutch coasts. These are felt more on the Batneh coast, which is then a dead lee-shore, and without shelter. A dense haze (from the dust off the Mekran coast) sometimes precedes these N.-Easters. They blow frequently for three days, or even five days at a time, but sometimes last only for a single day.

Ras Abou Daoud, or Cape Keriyat (Curiate of the Portuguese,) in lat. $23^{\circ} 19' N.$, lon. $58^{\circ} 56' E.$, is a steep rocky point, with a rocky islet (100 ft. high,) at $1\frac{1}{2}$ cables to the N., and a channel between it and the cape, with 3 and 4 fathoms. When Cape Keriya bears about S.S.W., it is nearly in one with the Devil's Gap, which is not conspicuous at this bearing; and when the cape bears S., the gap is shut in behind it. The Devil's Gap is in lat. $23^{\circ} 5' N.$, distant about

* See Admiralty Chart, No. 10 c., N.E. Coast of Arabia, with Mascara Island.

11 leagues from Muscat, being an excellent mark for knowing the land. Under this gap is said to lie the anchorage of Keriya, where a ship may anchor in 12 fathoms good ground, about 2 m. off shore, and be sheltered from the N.-Westers by the projecting land of the cape; but a sudden change of wind to the S.E. would imperil her. In the bay, S. of Cape Keriya, there is a village of the same name, and a small island near the shore. Around the cape regular soundings are got from 25 to 30 fathoms, 2 or 3 m. off shore, which extend 3 leagues to the W.; ships may, therefore, anchor here, when it falls calm. The government of Muscat sometimes extends to Ras-el-Hadd, although it is not safe for Europeans to land at the villages near the cape, because the inhabitants are inhospitable to strangers, and the Bedouins, or roving Arabs, often keep some of these villages or towns in subjection. The coast abounds with excellent fish, which, with dates, are brought off by the country boats to ships passing near the villages. Between Cape Keriya and Muskat, is the projecting point, Ras-el-Kheiran, which is sometimes mistaken for the cape, from which it bears about N.W. by N.; and from hence the coast runs about N.W. by W. to Muskat Point; the distance between it and the cape being about $8\frac{1}{4}$ leagues. All the land in this place is high and uneven, rocky towards the sea, of barren aspect; no soundings to be had except very close to the shore. From Ras Abou Daoud to Muscat, there is a confused mass of hills near the sea, with range beyond range of mountains behind them.

BUNDER KHEIRAN. Immediately to the W. of Ras-el-Kheiran are two islands not easily distinguished, owing to their uniformity of appearance and height with the main land, and to their not projecting beyond the line of coast. Behind the W. and larger, is the anchorage called Bunder Kheiran. The small island, in lat. $29^{\circ} 32' N.$, lon. $58^{\circ} 45' E.$, is $\frac{1}{2}$ m. long, and the channel behind it only 200 yards wide, tortuous, and very shallow; although at the entrance it has 3 to 5 fathoms. The W. island (300 ft. high,) is steep and rocky, and $\frac{1}{2}$ m. long; close to the E. end is a small detached rock, between which and the E. island is the entrance channel, 600 yards wide, with 15 fathoms in it.

The Strait, between the S. side of the larger island and a projecting point of the coast opposite, forms the anchorage, which is 150 to 200 yards wide; there are 4 to 5 fathoms in this part. Off the S.W. corner of the island, the Strait is wider, and has a rocky islet in the centre, with 6 to 7 fathoms on its E. side, and 3 to 4 round it. Near the S. end of this islet, a narrow passage leads into a shallow bay, extending a mile to the S., where it ends in a swamp. There is a large grove of date-trees, and a small village.

The W. entrance is about 150 yards broad, $\frac{1}{2}$ m. long N. and S., and has 9 to 7 fathoms in it. This harbour is only frequented by fishing boats; the winds are very baffling, particularly in the W. entrance, and blow in violent gusts during N.-Westers. A disabled steamer, requiring smooth water for repairs, might conveniently use either this sheltered harbour, or Bunder Jisseh.

BUNDER JISSEH is another small anchorage, 5 m. S.E. from Maskat, formed by a precipitous light-coloured island, 600 yards long and 140 ft. high, which stands in the entrance of a bay $\frac{1}{2}$ m. in length and depth. The E. entrance is 300 yards broad and has 7 fathoms in it; the W. one is blocked up by a flat rock, having only $1\frac{1}{2}$ fathoms on each side of it. The bay has 4 to 7 fathoms in it, and an indented outline, with an islet on the S.W. side, to the W. of which is a large village and date grove.

The coast is rocky; a succession of rocky points and sandy bays, with several villages between it and Maskat. Bistan has a date grove, the inhabitants are cultivators. Kantab, a small fishing village, has a pyramidal rock standing in the sandy bay close to the shore; this place lies under the hill called Maskat Saddle. Sidab Cove might afford shelter to small craft during a N.-Wester. Sidab village is separated from Maskat by only a small ridge, having a wall and gate in the pass.

MASKAT, or MUSKAT, is the capital of Ohman, and residence of the Sultan or King, whose territories extend along the coast from Ras Musandim to Ras-el-Hadd. Including the adjacent villages and towns, from Sudab to Matreh, it may contain about 60,000 inhabitants; but this is merely an estimate.

On the death, in 1856, of Seyyid Sa'id bin Sultan, the kingdom was divided; his son, Seyyid Taweyni succeeded him in Ohman, whilst the African territories (Zanzibar, &c.) went to another son, Seyyid Majid, who died in 1870, and was succeeded by Seyyid Burghash. The ruler of Maskat is not properly called Imam, but Seyyid, or Prince; sometimes he is styled Sultan. The extent of his dominion in Arabia is practically limited by the distance at which he can enforce his authority, which, in general, is only near the sea-coast; he has a small, regular force of Arabs, Mekranis, and Sidis (Africans), who garrison his forts and Persian possessions; they are only armed with matchlocks, swords, spears, &c. He has lately obtained a few field-pieces and some artillerymen from the Persians. In addition to his Arab possessions, he holds the islands El-Kishm and Hormuz, and the Persian coast from Khamir to Jashk, of the Persian Government, on payment of a tribute: he

also holds Gwadel, and several places on the Mekran coast between that and Jashk. The fleet of the late sovereign was divided between Zanzibar and Maskat. The present Maskat squadron consists of an old-fashioned 36-gun frigate, one or two corvettes, and a few brigs, armed baghalahs, &c.

The Ohman revenues are much curtailed by the loss of Zanzibar, and the kingdom has suffered from civil commotions since the death of Seyyid Sa'id bin Sultan, who reigned 52 years, and left fifteen surviving sons, many of whom have been fighting for supremacy ever since. Their names were Thuwainy, Muhammad, Toorky, Majid, Burghash, Abd-el-Wahab, Ghalib, Abd-el-Ahziz, Khalifah, Suwaid, Abbas, Menin, Bedran, Nasr, Abd-el-Wahhab. The eldest son and successor was assassinated in Feb., 1866, by his own son, Salim, who held the reins only till Oct., 1868, when he was overcome and turned out of Maskat by Ahzan-bin-Kais. Now, either the latter or Toorky is the ruling Seyyid. The Sheik of Abu Zhabi, in 1869, took up Ahzan's cause; whilst the chiefs of Debai, Ajman, and Ras-el-Khaimah, co-operated with Toorky, and his brother, Majid, sent him money from Zanzibar. In August, 1872, the Seyyid Toorky remained supreme as Sultan of Maskat.

Maskat was in possession of the Portuguese from A.D. 1508 to 1651, when they were expelled from all their possessions in Arabia by a simultaneous revolt of the Arabs. They fortified the place strongly, and built the forts Jillali and Merani; probably the others also are, in part at least, of Portuguese origin. In a Portuguese inscription over the inner gate of Merani is the date 1588, and in an old wooden gate at the custom-house, is cut "Anno 1624." Their expulsion from Maskat was effected by the Imam Sultan-bin-Seif, about A.D. 1651—2, but only through the treachery of a Banyan, Narootem by name, who was Treasurer and General Agent to the Portuguese, and whose daughter the Commandant, Pareira, foolishly insisted on marrying. The crafty Banyan obtained his consent that the marriage should be postponed for a year; then he advised the Commandant to clear out the water-tanks, to have all the powder restored, by being pounded anew, and the old supplies of wheat to be removed, to make way for new. The stratagem succeeded, and whilst the Portuguese were unprepared and lulled into fancied security, Narootem secretly communicated with the ruler of Ohman, Sultan-bin-Seif, advising him to attack the place on the following Sunday. The Arabs came on that day, surprised and slew the Portuguese, and recovered their town. The same Imam, fired with his successes against the Portuguese, attacked Diu and Damaun, carrying off an immense booty.—(See Hakluyt Society's "Imams and Seyyids of 'Oman.")

The whole of the fortifications, both land-ward and sea-ward, are in a very dilapidated state; the guns are chiefly Spanish and Portuguese, the iron ones quite rusty and useless, and the carriages dropping to pieces. A few brass guns are in better condition; one fine old Spanish gun in Merani Fort has the date 1606.

The Maskat Government has treaties with Great Britain, France, and the United States. The late sovereign was a faithful ally of Great Britain, and fought with us against the pirates, &c. Maskat pays a religious tribute, or tithe, to the Wahabbi chief. The population of Maskat and Matreh is very mixed, with a large infusion of African blood. Kalbuh, Riyam, and Arbak are inhabited by a higher class of Arabs. At Kalbuh are the Beni Marazik; at Riyam the Beni Ahmed; Shateif, Mateireh, and Sudab villages are inhabited by fishermen.

Supplies. Notwithstanding the barren appearance of this place, the country inland is in many parts fertile, and furnishes considerable supplies. Water is brought from the wells in the suburbs, in a small aqueduct, by the side of the great water-course, to the landing-place, and brought off in native boats; if a vessel has no casks, they would bring it off either in bulk in a boat, or perhaps in one of the large wooden tanks used by baghalahs, but it is advisable to see that the tank has been cleaned out properly. Occasionally, after a long drought, the water is scarce and bad; but as a rule, good, and in sufficient quantity. Fire-wood is procurable; so are sheep and cattle (the latter are best); vegetables; fruit, viz.:—limes, oranges, grapes, pomegranates, mangoes, plantains; fowls, plentiful and cheap; flour, all ground in hand-mills; Arab bread; rice and dhol (Indian pea,) which come from India; and the usual other articles required for a ship, excepting spirits, salt meat, and biscuit. No coal is obtainable here; but the Indian Government generally has a few hundred tons here for the use of their own vessels.

British Agent. There is an agent here, hitherto a native; but an European officer, with the rank of vice-consul, has been lately appointed. Price currents, rate of exchange, &c., which vary much, would be obtainable from him. There was a French agent here till recently, but it is not certain whether there is one at present.

Trade. The dollar is the coin preferred. The rate of exchange is settled by the Banyans, of whom more is said below. The exports are: corn, brought from the opposite coast of Persia, and mules and asses from the interior, which are sent to the Mauritius and to Bourbon: salt is exported to Calcutta, also dried fish, and shark-fins, &c., for the Chinese market: dates are exported to the Malabar coast, Kutch, &c.

The imports, on which 5 per cent. duty is levied without distinction, are:—sugar from the Mauritius; from India: piece goods (from Bombay); large quantities of rice, and some teak timber (from Malabar); indigo (from Calcutta); ghee (from Karachi and the Mekran coast); cotton and native fabrics (from Kutch); coffee, &c., from the Red Sea. There is also trade with Zanzibar and the African coast. There is a large number (several thousand) of Hindoos of the Banyan caste, settled here, chiefly from Kutch and Gujerat, and the trade is much in their hands: they have always been encouraged by the Maskat Government. The customs are farmed to some of these men for a certain annual sum. They only settle here temporarily, and do not bring their families with them. A small colony of these enterprising men is to be found in most towns of the coast of Arabia. The manufactures are few: certain kinds of cloths, used by the Arabs, are woven; and arms, as swords, match-locks, &c., made here.

There are several fine square-rigged ships belonging to this port, besides a great many baghalahs and other native craft.

MASKAT COVE is the E. of five coves, lying between Ras-es-Shateif and Ras Maskat, a distance of only $1\frac{1}{2}$ m. It is formed by the steep rocky island called Maskat, or El-Jezirah, and a smaller one, on the E. side; and a high point of land on the W.

Maskat Island, 850 ft. high and precipitous all round, is 1,400 yards long, by 200 to 500 broad: it has deep water close to outside; 30 fathoms at 2 cables off. Its coast-line is very irregular, and at 2 furlongs from the S. end, it is nearly divided by two little coves opposite each other, the hill being quite low just between them. The N. point of the Island, called Ras Maskat, is a round, sloping bluff, while the points to the W. of it are cliffs. On its W. side, just within the cove, is a fort or battery near the water, with a tower half-way up the hill, called Sirah (es-Sirah esh-Sharkiya, or the E. battery.)

Fisherman's Rock, lying off the N. tip of Ras Maskat, in lat. $23^{\circ} 38' N.$, lon. $58^{\circ} 35' E.$, is 10 ft. above water, 20 yards across, and separated from the Island by a strait 50 yards broad, with 2 to 3 fathoms in it: this rock may be rounded quite close, as 5 yards off it there are 6 or 7 fathoms.

The Cove is $\frac{1}{2}$ m. deep N.N.W. and S.S.E., and $\frac{1}{4}$ m. wide at the entrance; half-way in, it is contracted to $\frac{1}{4}$ m. by a projecting point on the W. side, running out E., inside this it widens; at the head it is 300 yards across. The soundings are 12 and 18 fathoms in the entrance, shoaling gradually to 7 and 8 at the narrow part, and to 2 fathoms about a cable from the white sandy beach at the head of the cove, on which the town stands. There is deep water close to all the points round the cove; the little bays in it are shoaler. Merani Fort, called also Kalaht-el-Gharbiya, is at the bottom of the cove, and close round it on the S. side, is the landing-place, which is on the rocks just where the great water-course discharges itself into the cove; here also, is a small place for hauling up and repairing boats.

The W. side is a detached precipitous ridge, 436 ft. high; its N. point is called Ras Kalbuh, or Ras Dukkhhan. The projecting point, before-mentioned, is 250 yards long by 60 broad, and about 100 ft. high, being a spur of the main ridge of Ras Kalbuh, and on it is a fort with two rows of embrasures, and a round tower on the highest part, called also Sireh (or Es-Sirah el-Gharbiya, i.e., the W. battery, if required to distinguish it from the other.) On the inner side of this point is formed a bay, called Makalla, with 3 fathoms and under, where the small native vessels anchor. There are several low towers on the different peaks of this ridge, which slopes down at its S. end to a cliff about 150 ft. high, with a large fort on it called Merani, with several round towers on the hill, and a battery near the water level.

The front of the town occupies the bottom of the cove, and is built close down to the water along the beach, so that the sea washes against the houses at H. W. The walls of the town enclose a space of 700 yards by 250, while the suburbs, built of mat huts, occupy every available piece of level ground in the vicinity. The wall is built on the W. and S. sides, the E. and part of the S. side being built close up to, and even against the face of the hills. The Seyyid's palace is the largest building facing the sea, and to the E. of it is a small wharf, with the custom-house. The mosques are small, and, like all in Ohman, have neither domes nor minarets. There are several towers on the hills behind the town; one, called Buma Sali, built on a ridge (highest part 500 ft.,) quite overlooks it and the cove. Maskat Saddle Hill (1,340 ft.) stands 2 m. to S. of the town.

Between the town and Maskat Island are two small detached hills, the S. of which, about 100 ft. high, is joined to the town by a low, sandy isthmus, and has a large fort on it called Jillali, which has two tiers of embrasures, both casemated, and a round tower at each end; there is a fine flight of steps cut in the rock up to this fort. This and Merani are the two principal forts, and quite overlook the town. The other hill forms an islet at H. W. about 60 ft. high; with a passage with only 1 ft. at L. W., and 30 yards wide between it and Maskat Island, called Doweireh. Behind these is a cove or series of little coves, between Maskat Island and the main; there are two remark-

able natural pillars of rock in it, one close to the S.E. tip of the island, the other $\frac{1}{2}$ m. to the S.; just below the latter is a projecting point called Ras Jen'adeh, a perpendicular cliff about 250 ft. high, conspicuous from the N. In one of these little bays, called Moghub, close to the S.E. of Jillali Fort, the Red Sea and Karachi telegraph cables were landed.

Fahl, or Fahl Islet (280 ft. high,) is of light colour, quite precipitous, deep-to all round, and has no danger near it; it generally shows light-coloured against the land. It lies $5\frac{1}{2}$ m. to the N.W. of Maskat Cove. From the E., when the sun is shining on Jillali Fort in the morning, it sometimes shows white, to the N. of Maskat Island, against the hills behind; all the hills about Maskat being of a very dark colour. Fahl Islet is in lat. $23^{\circ} 41' N.$, lon. $58^{\circ} 30' E.$

Tides. In Maskat Cove it is H. W. on F. and C., at 9 h. 15 m., and the rise and fall is 6 to 8 ft. (approximate.)

DIRECTIONS. Approaching Maskat from seaward, either from the E. or W., the Saddle Hill, 1,340 ft. high, is remarkable; it is formed by two sharp peaks, the highest of the very jagged dark range behind Maskat; they are in one when bearing W.S.W. If coming from the N. this hill is not so conspicuous, as the peaks are some little distance apart. In the back-ground will be seen in clear weather the Kerriyat range of mountains, and to the W., the mountains Jebel Tyin and Jebel Nakhl, with lower ranges between them and the coast-range. The place has often been passed by strangers, especially steamers, as the towns do not show well under the dark hills, and lying at the bottom of coves, are only visible with the cove open. As there is no danger on this part of the coast, steamers especially should not be far out, and then Fahl Island cannot be overlooked.

In the day-time a ship should run into Maskat Cove, and anchor well over to the W. shore, which is the weather side in a N.-Wester. If only calling at the place, she may anchor in 13 or 14 fathoms in the entrance; but if requiring supplies, &c., it is advisable to anchor, if there is room, about abreast of the W. fort Sireh, and pretty close to it. The Sultan's ships of war lie further in.

The place is nearly open to the N.-Wester, which blows a couple of points off the W. side, while the sea sets straight into the cove; so that vessels making a long stay here, always use a stern anchor to keep their head on to the swell. The N.-Easter, or Nashi, also sends a heavy sea into the cove, and there is little or no shelter from this wind. The bottom is sand and shells, but with a long scope of cable, vessels need not apprehend driving, as the anchors would have to drag so much up hill; and when near the rocks, there appears to be a rebound of the wave, which lessens the strain on the cable. Outside the cove in depths above 20 fathoms, the bottom is clay or mud. The deep-sea lead will not get bottom at 1 league off Maskat.

The wind (when there is any) nearly always blows into this cove, vessels generally have to warp out till able to make sail, but there is often a light land-wind at night, sufficient to enable a vessel to get out. In April, 1847, Maskat was visited by a storm of a cyclonic character, and two days after the Bombay (*Cleopatra's*) cyclone; this did great damage to shipping in the cove; several vessels were driven on the rocks: rain fell in torrents, and the streets were flooded.

By night, a vessel arriving from the E. should run up the coast, keeping to the S. of the parallel of Ras Maskat, or make short tacks up to it, so as to be sure of not passing it, as it will then form the extreme of the land; and she should remember to round the *first* point, and as close as possible. Fisher's Rock would be seen, probably, by its horizon being lower, or as a notch in the water-line of Maskat Island; after rounding it, keep a look-out for the shipping, and anchor in the mouth of the cove, well over to Ras Kalbuh, which by night always appears much closer than it really is.

Coming from the W. or N., a vessel should make Fahl, from which Fisher's Rock bears about S.E. by E., 6 m. Remember, however, that Ras Maskat will be the last point, and nothing will be seen to the E. of it. In 1857, a steamer, not attending to this, got on the rocks in Kalbuh Cove, which she had entered at night, taking it for Maskat Cove. The shipping does not show well against the hills, but when close, their hulls might be seen, especially from aloft.

The four other coves are called after the towns situated in each; Kalbuh, Riyam, Matreh, and Shateif. That of El-Matreh is largest and best.

Kalbuh Cove is a small cove between Ras Kalbuh, before described, and Ras-el-Bahs Point with an isolated hill about 100 ft. high, with a round fort on it. It is 3 cables long by $2\frac{1}{2}$ broad, with 8 fathoms in the entrance, and shoaling gradually up to the town; is quite open to the prevailing winds, and not frequented by shipping. There is a spit of rocks, covered at H. W., extending $1\frac{1}{2}$ cables W.S.W. from Ras Kalbuh.

In appearance the town resembles Maskat on a smaller scale. It extends $\frac{1}{2}$ m. back up the valley from the sandy beach, and nearly joins the suburbs of Maskat, being separated from them by a low ride, over which the foot-path passes. There is a wall and gate to cut off the communication. The hills on the W. side of Kalbuh, or Killabuh, are about 250 ft. high, and are

like Ras Kalbuh, nearly detached from the main range of hills behind. Between the isolated hill forming the W. point of Kalbuh Cove and this ridge of hills, is a sandy isthmus, on which is a little village called Doheh, with some stone houses; a part of the village is detached, and lies a little back in the hills to the W. of the point.

Riyam Cove is about the size of Kalbuh, with soundings decreasing from 5 fathoms. It is not visited by vessels, being also open to the prevailing winds. Between this cove and Doheh a small spit of rocks runs off half a cable. Riyam Village is smaller than Kalbuh, and extends $\frac{1}{2}$ m. up the valley, whence there is a foot-path for a $\frac{1}{2}$ m., over a fortified pass, to the suburbs of Maskat; to the W. of the village is a steep and rugged pass to Mateireh and Matreh. The W. point of Riyam Cove is a detached hill about 80 ft. high, quite precipitous, and having a sunken rock 70 yards off to the N. of it; to the W. of this point is a bight, used by small native craft in a N.-Easter, and sheltered partly in a N.-Wester by Ras Kowaser; it is called Bunder Dinaja.

Matreh Cove, $\frac{1}{2}$ m. broad, and 6 cables deep, is between the W. point of Riyam Cove and Ras Kowaser. It contains several little bays and villages, besides the town of Matreh, which stands at the head. Next to W. of Bunder Dinaja is a small sandy bay, with a large village called Mateireh, (Little Matreh) extending back some distance. A detached hill about 100 ft. high, with a large castle on it, called Sirah Matreh, separates this village from Matreh; there is a foot-path round inside this hill to that place, which is nearly connected with Mateireh.

EL-MATREH, on W. side of the cove, is a town about the same size as Maskat, and inside the walls, well built. It has a front of nearly $\frac{1}{2}$ m., along a fine sandy beach at the head of the cove. The only pass from Maskat into the interior by land is from this place, which is fortified on the land side, where the hills are not inaccessible, by a wall and towers; there are also many detached towers on the hills round the town.

The communication by land with Maskat, which is very rugged, is through Mateireh; and thence either to Riyam and Maskat (*see* Riyam), or from Mateireh to Maskat direct by a very rugged steep pass. These paths are not practicable for loaded animals. Everything is sent between these places by sea in large canoes; and, if not blowing hard, the general mode of transit is by boat. Large numbers of these canoes ply regularly between Maskat and El-Matreh, most of the merchants of the former place residing here. This town is under a wali, or deputy of the sultan. The Khojeh sect have inside the town a separate fortified quarter, containing about five hundred houses, into which none but Khojehs are admitted; this is called Mahallet-el-Luwatiyah. At 6 furlongs to the S. of Matreh Castle is a remarkable sharp peak, called on the chart Matreh Peak, the highest on that range.

Arbak. On a projecting rocky hill, about 60 ft. high, forming the N. point of Matreh Bay, is a small fort, and in the sandy bay on the other side of it, lies the town of Arbak, which has a tower and wall separating it from Matreh in the pass behind the hill. There is another small fort on a hill immediately N. of Arbak. **Ras Kowaser**, a precipitous point about 200 ft. high, has a rocky ledge, on which are several detached high rocks, extending $1\frac{1}{2}$ cables off it, and a low islet a cable N. of it.

Anchorage. Matreh Cove affords good shelter in a N.-Wester, but is open to the Nashi or N.-Easter. The larger native vessels always anchor in this cove in preference to Maskat, but square-rigged vessels seldom use it, always going to Maskat. The anchorage is close under the shore, between Ras Kowaser and Arbak. The landing-place at Matreh is at either end of the sandy beach; in a N.-Easter the best place to land is on the rocks just at the N. end of the beach.

Shateif Cove, the last of the series of coves about Maskat, is small, open to the N.-Easter, and is never used by shipping. The little village is insignificant. There is a foot-path through the hills to Arbak. On the N. side is a high ridge, about 350 ft. high, which ends in the perpendicular bluff called Ras Shateif; it has 20 fathoms only $1\frac{1}{2}$ cables off.

POPULATION AND TRADE OF ARABIAN COAST.

The trade of Ahden and the Arab tribes to the W. of that place were described at the end of Chapter VII. This is a continuation of that description, and it is hoped that navigators will now find the Arabs in the vicinity of Ahden more civilized than they were at the period when the surveyors of the old Indian Navy first thoroughly examined that coast. Ahden is situated in the territory of the **Abdali tribe**, said to number about 10,000 souls, who are not always friendly towards Europeans. Their chief town, situated 17 m. to N.N.W. of Ahden, is Lahej, where the Sultan resides, and whence supplies of fresh provisions come into Ahden.

Gubet Seilan. From Cape Ahden, which is, perhaps, the most remarkable feature on the

S. coast of Arabia, the coast turns suddenly to the N.N.E. for 14 m., then again to the E. for 12 m., reaching to Ras Seilan, forming the bay called Gubet Seilan. The shores around the bay are flat and sandy, particularly in the centre, gradually improving towards Ras Seilan. A low plain extends into the interior covered with stunted bushes, and patches of the cotton-tree and acacia, which latter thrives luxuriantly in this arid soil. The soundings in this bay are irregular, and shoal water extends off shore. Vessels should avoid it, if possible, owing to difficulty in getting out of it, when blowing hard from the E. Several vessels have been wrecked here, and plundered by the natives.

This part of the coast is inhabited by the **Yafahi**, a numerous tribe of about 20,000 persons, reaching inland to the high mountains 30 to 40 m. to the N. and N.W. of Ahden, called Jebel Yafahi, which have numerous valleys producing coffee, wheat, and jowari, in abundance. The Yafahi have no vessels. The village of Sheikh Abdulla-ibn-Marboot, about half a league inland of Ras Seilan, is the boundary between the Yafahi and Fudhli tribes.

SUGHRA, or **SHUGRA**, the principal port of the Fudhli territory, is a small village, with a stone building called a castle, the residence of the Sultan for several months in the year. It is situated about $\frac{1}{2}$ m. from the beach, on the borders of a plain, behind which is the Wadi Bahrein. Jowari (millet) is cultivated here in large quantities, and in the vicinity of the village is a large grove of date-trees. Good water may be obtained here, also bullocks, sheep, poultry, onions, and pumpkins.

The **Fudhli tribe** is reckoned at 15,000 persons. The officers of the East India Company's surveying brig *Palinurus* were cordially received by the Sultan; but as a general rule the Fudhlis are not to be trusted; they would take advantage of a vessel in difficulties,—as being on shore, and unarmed,—and seize the opportunity to plunder. The Fudhli territory is stated as extending in a N. direction for a distance of 80 m., bounded on the E. by Makatein, and the Urlaji tribe, and reaching as far as Ras Seilan on the W., comprising about 70 m. of coast. The country is chiefly mountainous. Jebel Kharazi, a high range 16 m. N.E. of Sughra, reaching 5,442 ft. above the sea. The Wadi Bahrein winds through this range of mountains, abundantly supplied with streams which flow into an extensive lake, whence the valley takes its name. The largest village in this district is Mein, with a population of 1,500, said to be thirty-six hours' journey to the N.W. of Sughra. Many of the natives are said to inhabit caves in the mountains: they are a fine, bold-looking race of men; their religion is a lax state of Mohammedanism; the fast of the Ramazan almost passes unnoticed.

Trade. The chief exports of Sughra are ambergris, coffee, jowari, and ghee, or clarified butter. No fruit is grown except the plantain. Rice is highly prized by the natives.

HOWAIYAH is a town 5 m. inland, situated on a wide plain, bounded on the N. by high mountains; the tops of the houses only are perceptible from a vessel in passing. It is the principal residence of the chief of the Urlaji tribe, with a population of about 5,000 (in 1836), chiefly agriculturists. An abundant supply of good water may be procured here, also bullocks and excellent fish. Ras Urlaji, about 120 m. to the E. by N. of Ahden, is a low sandy point, about 6 m. to the S.S.E. of Howaiyah, on which stands the village called Howtha. About 20 m. further E. is the tomb of Sheikha Hurba, a female devotee, who is said to have perished from voluntary starvation: this ancient shrine is erected near the beach, and a very conspicuous object; being whitened, it can be seen for several miles. At 7 m. from this tomb lies Wadi Sanam, the E. limit of the Urlaji territory.

The **Urlaji territory** extends about 55 m. along the coast, from Makatein on the W. to Wadi Sanam on the E., and is said to reach 200 m. inland. The coast is very flat, but about 35 m. inland is a high mountainous range of very irregular outline. The tribe can muster from 7,000 to 8,000 fighting men.

It was at Howaiyah that the crew of the merchant ship *Nathaniel* were treacherously murdered in 1715; but the chief of the Urlaji tribe denied to Captain Haines, of the *Palinurus*, who visited him in 1835, that his ancestors were implicated in the deed, they only having obtained possession of the country in 1775. During the survey of the coast in 1835, one of the boats of the *Palinurus* was fired at by some of the roving Bedouins; it is therefore advisable to be very cautious in all dealings with the natives.

From **Wadi Sanam to Ras-al-Kosair**, is the territory of the **Diyabi tribe**, which extends along the coast for about 36 m., and inland, to the N. of the Hamari mountains. The tribe number about 800 souls, who bear a bad character, and are very much feared. They dwell principally in excavations of the rocks. Having no governor, or chief, to control them, their lives are occupied in murder, plunder, and every crime of the deepest dye.

At **Ras-al-Kosair** commences the territory of the **Wahidi tribe**, which consists of several

thousand persons, and, it is said, can muster 2,000 match-locks in case of war. They are a brave and hospitable race, civil and generous to strangers who treat them with familiar kindness, but cunning and revengeful when oppressed; they are much respected and feared by their neighbours; their inland towns are very considerable, and well populated.

In a small bay to the W. of Ras-al-'Asidah is the town of Bah-l-Haf, so named from a sheikh whose burial-place is contiguous. The bay affords good shelter during E. winds; a good look-out must, however, be kept in the event of the wind changing to the W. There seems to be a **small trade** here, consisting principally in importations of coffee, cotton cloths, and coarse silks, brought from Makalleh, Shahah, and Ahden. The town is garrisoned by two or three Wahidi soldiers, who levy tolls on all merchandise landed. There is no fresh water here but what is brought from a distance.

Hisn Ghorab and Makdahah Bays, to the E. of Bah-l-Haf, also belong to the Wahidi. Bunder Hisn Ghorab affords shelter in the S.W. monsoon. The Bay of Makdahah,—of which the Kadhrein Rocks form the W. limit,—is a very excellent anchorage and shelter from E. winds. The village of Makdahah is very small, consisting of one stone and mud building, and a few huts, lying in the E. angle of the bay; it affords no supplies, and the water is very indifferent. It is the residence of a chief, a tributary to the Sultan of the Wahidi tribe, who derives the principal part of his revenue from the guano on Jiboos Island. The inhabitants are wholly dependent on other ports for food.

Ras Rehmat, or Cape of the Wind's Death, 8 m. N.E. of Ras-al-Kelb, is elevated about 300 ft., composed of lime-stone, and of a dark-peaked outline: on its S.W. face, the sand from the plain has been swept up into a great heap by the S.W. monsoon. It takes its name (**lull of the wind**, a term frequently used by the Arabs, when it falls calm) from the effects experienced by the baghalahs in running up the coast during the tadh birih, or early part of the S.W. monsoon; the Arabs considering that when they round this point the violence of the wind has abated. From seaward this cape is remarkable, as being the commencement of the bold, dark, and precipitous land extending to within 15 m. of Makalleh. Here is the E. limit of the Wahidi territory, which has a coast-line of 60 m. in extent; its only two ports are Bah-l-haf and Hisn Ghorab.

BUNDER BUROOM is a secure anchorage during the S.W. monsoon, but open to E. and N.E. winds. The town of Buroom lies at the N.W. angle of the bay; it is surrounded by date-trees, and situated immediately at the foot of an off-set of the range of hills, which here extends down to the shore, and forms a bold and rocky coast. In 1835 its population was about 450 persons. The houses and huts are wretchedly built. This town, as well as Fuwah, Al Ghaidhar, &c., is under the chief of the Berishi tribe; he has also several smaller tribes tributary to him. Ijilli, a white mosque erected on an eminence a short distance from the beach, may be plainly seen by vessels passing along shore.

The territory of the **Berishi tribe** extends along the coast from Ras Rehmat to Fuwah in the Bay of Makalleh, a distance of 25 m., with a vast district inland. The tribe is called collectively, Berishi, and under one Sultan; but is subdivided into four lesser tribes, each having its own name and chief. The valleys inland are rich and beautiful, producing large quantities of jowari; they are bounded by the purple-veined mountains which rise from 5,000 to 6,000 ft. above them, whose summits in the cold season are, it is said by the natives, at times covered with snow. Heavy rains fall in Nov., Dec., July, and August, and sometimes severe showers in April and May. The S.W. monsoon sets in in May.

Anchorage. The best anchorage with a W. wind is in 5 or 6 fathoms water, with the town of Buroom bearing N.W. Excellent water is to be obtained at Buroom Town, also fire-wood, sheep, fowls, eggs, onions, and pumpkins. Fuwah is a small town situated about half-way between Buroom and Makalleh, containing about 500 inhabitants, who appear to have a strong dislike to Europeans.

MAKALLEH, the principal commercial town on the S. coast of Arabia, is partially built on a narrow rocky point projecting about $\frac{1}{2}$ m. to the S., and partly at the foot of a range of reddish lime-stone cliffs, rising about 300 ft. immediately at the back of the town, and on which are six towers for the protection of the place. Almost directly above this remarkable level range of cliffs, the flat-topped summit of Jebel Gharrah—the base of which is lime-stone, and the upper half of beautiful white marble, traversed by blue and grey veins—rises 1,300 ft. above the sea, and may be seen at a distance of 42 m. The N. portion of the town is built on ground sloping from the base of the hills to the bay, and enclosed on the W. side by a wall extending to the shore, with only one entrance gate. The house of the Governor, who belongs to the **Hamoem tribe**, is a large square building, the others are chiefly adjan huts, intermingled with stone houses, and two mosques. The houses on the projecting rocky point to the S. are of stone, and a better description of build-

ing. In Makalleh Bay, though a swell may roll in with the sea-breeze by day, yet generally the wind falls light towards night, and the swell subsides. A vessel may lie here in perfect security during the N.E. monsoon. The natives report that the S.W. monsoon blows home fresh; but, as the sun declines, the wind and swell decrease; and that often during the morning it blows strong enough from N.W. to carry a ship clear out to sea: they say that a vessel with chain cables might ride out the S.W. monsoon in the Bay with safety. The weather in the Bay is exceedingly warm during the middle of the day; and on shore the heat is excessive. Land and sea-breezes, with light showers of rain, are however occasionally experienced in the months of Oct., Nov., March, and April, and often in June and July, which tend to cool the atmosphere.

Although the immediate vicinity of Makalleh is particularly barren, yet this is not the case a short distance inland. Leaving the town and proceeding to W. along the beach, the debouchement of a trodden-bed is reached, where there is a long narrow slip of salt water, such as is commonly seen at the ends of these places, and following this water-course for about a mile, some extensive date-groves and a large garden are met with. These belong to the Governor of Makalleh, who has built watch-towers there, occupied by his soldiery to protect them from the incursions of the Bedouins. The garden is irrigated by a stream of water, which is found to be derived from a rivulet that has its source in a rocky ravine of the mountains close by. On pursuing this rivulet to its origin, it is found to issue from a place about 300 ft. above the level of the sea, and at a temperature some degrees above that of the surrounding atmosphere. It soon increases in size, and falling over a little precipice into a natural basin affords a most convenient place for bathing. There are many springs of the kind in the neighbourhood, and many holes and subterraneous hollows filled with water in the adjoining mountains. These all pour their contents into the rivulet mentioned, which, after a sinuous course, would, if its waters were not diverted to the garden, find its way to the lagoon at the debouchement of the torrent-bed. The water is fresh and tasteless, without smell or deposit of sulphur at its source, though attended in some parts by the presence of much magnesian lime-stone in botryoidal masses. The place where this spring is situated is called Bokharen, and the stream which flows from it is surrounded by date-trees. The inhabitants of Makalleh wash their clothes there, and obtain their daily supply of water from it.

Supplies. Good water is to be obtained, but it requires watchfulness here as elsewhere on this coast. Vessels should supply their own casks, or the water will be brought off in skins, in quite a brackish state: it is procured from a well 2 m. to the W. of the town. Fire-wood, bullocks, sheep, fowls, eggs, and some descriptions of vegetables, are to be had in abundance.

Trade. There is a very considerable trade at Makalleh, which is carried on with India, the Red Sea, and Muscat. The exports consist of gums, hides, large quantities of senna, and a small quantity of coffee. The imports are chiefly cotton cloths, lead, iron, crockery, and rice, from Bombay; dates and dried fruits from Muscat; jowari, bajri, and honey, from Ahden; coffee from Mocha; sheep, honey, aloes, frankincense, coffee, dye, and slaves, from Berbereh, Bunder Kosair, and other African ports; portions of which are re-shipped for Bombay. There is also a considerable and profitable coasting trade carried on with the different vessels passing to and from the Persian Gulf and Red Sea, which remain here, according to the custom of Arab sailors, a few days to rest, after being a short time at sea. The greatest number arrive during the date season, sometimes as many as twenty or thirty a-day, of from one hundred to three hundred tons' burthen, some with goods, others with pilgrims. Traffic in slaves exists to a great extent.

Makalleh is ruled by a nakib, or governor, one of the Hamoom tribe, who derivé his revenue from customs duties levied on imports, and harbour dues. The population is a very mixed one, consisting of people of almost every nation. The anchorage off the town is good, in 8 to 10 fathoms water, sandy bottom, with the flag-staff of the Governor's house bearing N.N.E., and about 3 cables off the point.

SHEHR, or SHAHAH, the chief town of the district of this name, extends 1 m. along the shore, having a fortified castle, the residence of the Sultan, on an eminence, which is visible from sea-ward before any other object in the town. Here is a mosque and a custom-house. The town is built in the shape of a triangle, dwellings being much scattered. Population (in 1836) about 6,000. Water is bad. Sheep and vegetables may always be obtained. The old town of Shehr, once a thriving place, but now in ruins, and inhabited by only a few fishermen; though formerly the residence of the Chief of the Kasaidi subdivision of the Hamoom tribe, is situated about mid-way from modern Shehr towards Makalleh.

Trade. Shehr is a place of considerable trade. The Sultan and merchants have several vessels belonging to them; but the chief trade is carried on with vessels passing along the coast on speculation. The export and import duties in 1836 amounted to about £5000 annually. The manufactures of the town are not very extensive, consisting principally of coarse cotton cloths, gunpowder, and implements of war.

The **Hamoom Tribe** territory extends along the coast from Fuwah to Misenat, a distance of 100 m. The tribe is subdivided into ten, each of which divisions has its own name, and separate chieftain; but collectively they are called Hamoom, and are under the dominion of the Sultan.

Kosair Village, at 1 m. N. by E. of Ras Kosair, consists of a few stone buildings, but chiefly huts. The inhabitants have some few boats, and catch abundance of sharks, the tails and fins of which, when dried, they export to Muscat and Bombay, whence they find their way to the Chinese markets, fetching good prices. From Kosair the coast, for a distance of 30 m., is low, sandy, and uncultivated, presenting a dreary appearance. **Raidah**, a small town about $\frac{1}{4}$ m. inland, between Kosair and Misenat, is the chief place on this part of the coast, being the residence of the chief, who rules over the Kasaidi sub-division of the Hamoom tribe: his territory extends from Ras Baghashu to Misenat. There are several small trading boats belonging to the place. The exports are franciscense, aloes, ambergris, and sharks' fins and tails.

There are many hot springs here, which are said to possess great medicinal virtues; and from the number of places and ruins, and the cultivation which accompanies the presence of water here, this, next to Dhofar, may be inferred to be the most favoured part of the coast.

MISENAHT is an old ruin on the coast, 12 m. E. by N. of Raidah; the land about is swampy, and abounds in mangrove-trees. The remains indicate the site of a large town; several coins, and a pair of scales, have been picked up amongst the ruins at different times. This is a most interesting portion of the coast, containing as it does so many ruins and ancient inscriptions, which bear record of former greatness. The country, which was probably in former days fertile and populous, is now almost desolate, and the few inhabitants nearly always at strife with their neighbours. Wadi Sheikhawi, called by sailors the Shickowee Gap, a valley 10 m. inland, is easily distinguished by a remarkable gap in the mountains that encompass it: several inscriptions similar to those of Hisn Ghorab, &c., are to be found here.

Wadi Masilah, about 25 m. to N.E. by E. of Misenat, is a large and extensive valley, 6 m. wide, having on its W. side the high range of mountains called Jebel Asad, and on its E. side the high range which terminates on the coast at Ras Akab; it forms the line of communication between the sea-port towns and the province of Hadramaut. The valley is well watered by running streams, and villages and date-groves are numerous. On each side of the entrance is the ruin of a strong fort, showing that the pass to the interior was, at one time, thought worthy of being well guarded. The inhabitants are of the **Mahrah** tribe, whose territory extends from Misenat to Damghot. Wadi Masilah is certainly the grandest of all the valleys of this coast which open upon the sea, and running inland seem to divide the mountainous land of Southern Arabia into separate tracts. Its width, and the height of its sides appear enormous, and its summits are almost always bound together by overhanging clouds.

SIHOOT is a village 33 m. from Misenat, and S.E. of Wadi Masilah; from the sea it has the appearance of a large town, but is in reality in a most dilapidated condition. The scattered stone buildings in the neighbourhood have evidently been erected as places of defence against small arms. Its population, of the Mahrah tribe, varies from 300 or 400 to 2,000, according to the trade and season. Considerable intercourse with the interior is carried on through the Wadi Masilah.

The traders of Sihoot have several large and small vessels belonging to them, with which they carry on a lucrative trade in grain along the coast; the smaller boats are also employed in shark fishing, from which they derive considerable profit, the tails and fins, when dried, being sold at Makalleh or Muscat for the China markets. The anchorage is an open roadstead.

BUNDER LASK is a deep bight immediately to the N. of Ras Sharwein, affording excellent shelter during the S.W. monsoon for vessels of any size. The best anchorage is in about $5\frac{1}{2}$ fathoms, at $\frac{1}{4}$ m. from the shore, with the second and third bluffs of the cape shut out of view, where vessels will be completely sheltered from S.W. and W. winds, and lie in perfectly smooth water. In the other parts of the bay a heavy swell rolls in during the S.W. monsoon. The coast surrounding the bay is low and sandy near the sea, having a high range of hills in the back-ground, with a barren tract of undulating sand-hills intervening. Ras Derkah, 15 m. to the E.N.E. of Bunder Lask, also affords shelter in the S.W. monsoon.

Keshin, a large, straggling town, is situated in the depth of the bay, about $\frac{1}{4}$ m. from the beach, having a long sea front, which gives it the appearance of being larger than it really is. It is one of the principal ports of the Mahrah tribe, and the residence of the Sultan.

The population is small, and they have only a few trading boats, with some fishing boats. A small trade is carried on with the Persian Gulf, Zanzibar, and the W. coast of India. To Zanzibar and Muscat they export salt and dried fish, to India they principally send money; and in return import from those places jowari, rice, cotton cloths, dates, coffee, and sugar. Fish is very plentiful off the coast, and of excellent quality; it forms the staple article of food with the natives, and in a

dried state is given to their cattle. Good water is procurable here from a well to the W. of the town.

Wadi, one of the most powerful towns belonging to the Mahrah tribe, lies about three hours' journey from the landing-place at Kesid, under Ras Furtak; the road to it follows the valley at the W. foot of the Furtak mountains, having three or four forts for its protection. The population amounts to about 600 souls, 200 of whom are said to be well-armed men; they are wealthy for Arabs, and their arms well decorated with silver. They, with the whole of the Mahrah tribe, bear a bad character, and are not trusted by the trading Arabs; always ready to resent an injury, as was proved in the following instance:—They, on one occasion, sent two baghalahs with slaves for the Indian market, which were seized by the English authorities at Porbunder, on the Katiawar coast; on hearing which, the Sultan of Wadi seized a Por-bunder boat under English colours, by way of retaliation.

Wadi is a place of considerable trade, its port being Kesid; there are several baghalahs belonging to the inhabitants, in which they carry on a trade with Mangalore, Muscat, and Zanzibar, touching at other ports on their way. The principal exports are salt, salted fish, and shark fins. The imports are rice and cotton cloths from India; slaves, tobacco, and wood for building boats and rafters from Zanzibar and the African coast; and dates from Muscat.

It is the largest slave-dealing town on the coast; great numbers of slaves are imported annually, and sold to their own and other tribes.

RAS FURTAK, the largest and boldest cape on the S.E. coast, is a lofty, mountainous headland, of about 2,500 ft. elevation above the sea, and visible at a distance of 60 m. on a clear day. The whole of the high range is comprised under this name, but the cape is formed by a narrow ridge descending gradually to the sea, and extending S. a mile beyond the summit. The sea-cliff, which at Kalfot is about 50 ft. above the sea level, increases rapidly in height with the land, and soon arrives at a perpendicular escarpment of 1,900 ft., which it maintains on to the summit of Ras Furtak. The upper line of this cliff corresponds in its irregularity to the depressions and elevations at the summit of the range, while its base is concealed by the sea. It is by far the grandest escarpment on the S.E. coast of Arabia, being uninterruptedly perpendicular from top to bottom for an extent of 6 m. from the cape. At a distance, it has the appearance of an island. It is supposed to be the ancient Syagros, from its resemblance to a boar's head when seen at a distance of from 20 to 30 m., from either the W. or the E.

Although its surface appears perfectly smooth, yet it is so deeply weather-worn into shelves that men live on them, and descend by them to within a few feet of the sea below. It is said to be a common thing for them to fall over and be drowned. No part but the summit of this range presents any vegetation, and this is chiefly on the W. side, where the range gradually slopes to the plain below. Indeed, the barrenness of the Furtak range generally, as well as that of the land on each side, seems to indicate that this part of the coast does not catch much of the rain of the S.W. monsoon.

Khor Kalfot Bay, about 15 m. to the N. of Ras Furtak, is another place that affords some shelter to a vessel breaking down in the S.W. monsoon; several native boats of small burthen are hauled up here at that season.

Damghot, the only sea-port in Gubet Kamar, is a town situated in a valley at the W. extremity of Jebel Kamar, on an irregular plain about a mile square, and bounded on all sides, except the sea, by almost inaccessible mountains. A reef of rocks extends from the shore 250 yards, on which the sea breaks; on the E. side of this reef there is good landing when the S.W. swell is not very heavy; the W. side is almost unapproachable at such times. On the W. side of the plain is a salt-water khor, with a few date-trees round it; and on a cliff immediately over the town, stands a ruinous fort. The town consists of about ninety mud houses, with a population of about 400 people. They possess one baghalah, with which they trade yearly, exporting ghee, hides, and gums; and about forty small boats rudely sewn together, in which they are chiefly employed during the fair season shark fishing. Bullocks and sheep are procurable here.

This is the E. limit of the coast-line of the Mahrah tribe; between it and Ras Tharbat Ali the ground is said to be neutral, and inhabited both by Mahrah and Gharrah. There is a very extensive burial-ground here, in which are many ancient graves similar to those at Ras Risoot, while the more modern ones have ridges over them, marking the longitudinal axis of the body laid beneath. The latter, most probably, commenced with the introduction of Mahommedanism, the former being the graves of the old pagans.

Jebel Kamar. From Khais-ibn-Othman to Ras Sejer, the mountains rise like a wall from the sea, and the soundings do not extend more than a mile from the shore, falling off suddenly from 35 fathoms to no ground at 120 fathoms depth. The whole range of mountains from Damghot is comprised under the general appellation of Jebel Kamar, and, although sterile in appearance at a

distance, are clothed with wood from the base to the summit. The country from Ras Furtak to Thalghot is inhabited by the Mahrah tribe, the chief of which resides at Keshin. The remaining portion, towards Ras Sejer, belongs to the Beni Gharrah, who own no supreme authority.

Supplies. Bullocks and sheep are generally plentiful at all the villages in Gubet Kamar Bay, the price of the former being about eight German crowns, and the latter one German crown per head. Vegetables are not procurable, nor are any signs of cultivation anywhere to be seen.

The natives report that the S.W. monsoon sets in generally about the 20th of June, from which time it blows strong with a heavy sea. During this season most of the people retire to the mountains. Rain is uncertain, sometimes falling in abundance, and often the season passes over with none. The current which sets to the E.N.E., early in April, along the S.E. coast of Arabia, is apparently turned off at Ras Furtak, and strikes the coast again at Damghot; its average strength is 2 m. per hour. During the N.E. monsoon it runs in the opposite direction at the rate of 1 m. per hour.

The Mahrah Tribe is very numerous and powerful, its territory extends along the coast from Misenah to Damghot. They are an extremely bold and hardy race, in character crafty and treacherous, and are not trusted by the trading Arabs. Their enmity towards the English is very great, and they take every opportunity of evincing it. Collectively, they are under the rule of a Sultan, but are sub-divided into four branches, under distinct chieftains, which are again sub-divided into classes, each class having its sheikh.

Bunder Risoot, at the W. extreme of the lowland of Dhofar, and 40 m. to the W. of Merbat, also affords scant shelter to a small vessel breaking down on this coast in the S.W. monsoon. The coast is bounded in the interior by a high range of mountains, of from 3,000 to 4,000 ft. elevation, to the W. called Jebel Kamar, that to the E. being Jebel Sabhan, which skirt the coast, and terminate at Ras Noos. The appearance of the coast from Risoot to Diriz is very pleasing to the eye, presenting a constant succession of green fields, cocoa-nut groves, and buildings, with the high range of mountains in the back-ground.

To the E. of Diriz all traces of cultivation are lost, the ground being swampy and covered with mangrove, for a distance of 12 m., until the village of Thakah is reached. The coast between Thakah and Merbat presents a succession of lime-stone cliffs, of about 100 ft. in height; the high range of mountains, Jebel Sabhan, sloping down to within about a mile of their edge.

Near the mountains are several ruined forts, and on the mountain sides are several caves, into which the natives retreat during very hot weather, taking with them their cattle. The coast is bold to approach, there being 10 fathoms of water within $\frac{1}{2}$ m. of the cliffs. The habitations of men here are for the most part in the rock. They dwell in natural caverns, some of which are of enormous dimensions; and as these are for the most part situated on the precipitous portions towards the sea, their position and number may be distinguished when night comes on by their lights.

The extensive plain of Dhofar is bounded on the W. by the high land of Ras-al-Ahmar, and on the E. by Jebel Sabhan, near the village of Thakah: it is the most extensive of the lowland tracks that intervene between the sea and the mountains, which here recede to a distance of 15 m. It possesses a rich, arable soil, and an abundant supply of fresh water. The plain is but little cultivated, the inhabitants being an indolent race; and, with the exception of the towns on the coast, the country is uninhabited. There are several fresh and salt water lagoons in this plain. The former seem to be formed from fissures in the ground opened by some terrestrial convulsion, and are all filled with water to the brim; the latter are at the debouchements of water-courses which pass across the plain to the sea.

The soil of Dhofar is rich, and the remains of agricultural marks show that at different periods it has been generally under cultivation. When the coast-line of this plain was being surveyed, in 1844, large tracts of it were covered with maize and millet. There are also several groves of cocoa-nut-trees in it, which yield large nuts. For the protection of the cultivated parts, towers have been erected, from which watchmen discharge their match-locks on the approach of suspicious characters. But this is of little use, for the inhabitants of the mountains, who are the principal depredators in this case, linger about during the day at a distance with their flocks or herds, and when the night comes, turn them into the young corn, and eat the whole down in spite of everything. This but too frequently ends the labours of the industrious inhabitant of Dhofar, who has no appeal, nor dares interfere with the impudent intruder, a hair of whose head if injured, would bring his whole clan down upon the unfortunate agriculturist, under pretext for further dispossessing him. Hence it follows that the greater part of this fertile and well-watered plain remains uncultivated, and most of the inhabitants reduced to the greatest want, from the almost inevitable issue of their labours. Men may be seen going to till the ground with their sword in one hand and their hoe in the other.

The towns of Dhofar are congregated about its centre, near the sea, probably for mutual protection. They are five in number, viz., Diriz, Salalah, El-Hafah, El-Robat, and Okad. The

three former are situated around the ruins of an ancient city, now called **El-Balad**, on the sea-shore. El-Robat is a little distance inland towards the mountains, and has been deserted, on account of the continued predatory visits of the Gharrah. Okad is on the coast, a few miles W. of Salalah. In several parts of the plain there are ruined towns, like that of Al-Balad. They amount to six in number, and are said to have been built by the Min-Gui, or Minkuwi tribe, of whom you may read in Dr. Carter's description of El-Balad.

The inhabitants of the plain of Dhofar are partly Gharrah and partly Al-Kathiri, and so deeply involved in blood-feuds, that there are hardly two people among them who are not afraid to pass each other. Scarcely an inhabitant of one town dares go to another without a protector, called a *rubiya*, who is bound to take upon himself the insults offered to the man whom he protects. But these seldom amount to anything serious, for the *rubiya* being friends with all, few will open a blood-feud with him for the sake of being revenged on the man he protects; hence the latter is able to transact his business and return to his home with perfect security.

The inhabitants of this district, therefore, live in a most frightful state of anarchy. They are in constant fear of each other, and in terror of a descent of the Gharrah from the mountains. Indeed, their condition is as unhappy as can well be conceived. The inhabitants of the villages in the plain of Dhofar appear to have little intercourse with the Bedouins of the mountains, who only visit them for purposes of trade, exchanging their gums for rice, dates, &c., which are again bartered to the trading boats which visit the coast: they are a mixed race, and are, as most town-bred Arabs, timorous, indolent, and much addicted to the use of tobacco.

Not only the people of the plains, but the principal people of the mountains, are extremely anxious for the protection of a good government. The former hailed the arrival of the surveying vessels there with delight, hoping it was the object of the English Government to take possession of the country; and so persuaded were they of this, from the wish being father to the thought, that one of the principal sheikhs, a Gharrah chief, told Dr. Carter in confidence the number of men he could assemble at a short notice, and his willingness to place them at the disposal of the Government. This was the sheikh of Okad, a good old man, but depressed in spirit, and worn down by the intestine quarrels of his tribe.

During the S.W. monsoon, the wind, waves, and sand are said to render Dhofar so disagreeable, that the principal inhabitants retreat to the mountains, where they would appear to have estates and cattle. The plain, after the rains, is said to be covered with an incredible number of sheep and cattle. Horses they have none, or not more than half-a-dozen miserable creatures.

The frankincense and gum-arabic trees abound on the mountain slopes in the interior, as well as many other medicinal gums, which might be collected in large quantities; but at present the trade is small, owing to the want of some safe place of exchange or sale, as well as the want of protection; for there is no real safety, the inhabitants of the several towns being almost always at strife with each other, and the whole population of the plain in constant fear of the Beni Gharrah Bedouins, who oppress them very much.

The Ruins of El-Balad, about 33 m. to the W. of Merbat, and within 100 yards of the sea, are very extensive, covering a length of 2 m., with a breadth of 600 yards; and comprising groups of columns, with capitals, shafts, pedestals, &c. Part of the town was fortified with walls and ditches;—thus, a deep ditch and rampart on three sides of a rectangle; whilst the fourth—the sea-face—had a strongly fortified wall. There is good water to be obtained here, and at all the villages on the coast of Dhofar. It is dangerous for crews of ships to fill up their casks themselves, and in their own boats, owing to the surf which rolls in on the beach; the natives will bring out the water in their fishing-boats. A constant supply of small casks or barécas should be sent to the shore, as the natives are very lazy, and not easily induced to recommence work after once leaving off. The people will supply the water at the rate of 120 gallons for a German crown.

Dr. Carter, who visited these ruins during the Coast-Survey in the *Palinurus*, says they are the handiwork of such architects as are not now to be found on that coast; and he anticipates a day when El-Balad may again become a place of trade, in the following words:—

“The central position of El-Balad on the S.E. coast of Arabia, the fertility of the district in which it is situated, its proximity to Hadramaut, and its position as a port on the coast of that country in which the frankincense trees are so abundant,—together with many other medicinal gums that might be collected in vast quantities amongst the mountains of the same district, but which are all now regarded by the inhabitants as useless, from the want of some safe place of exchange or sale for the produce of their labours, as well as the protection of their property,—with all these advantages, under a good government, the walls of El-Balad might again show themselves above the waters in the centre of the district of Dhofar, as they formerly did when the Minkuwi

family found the trade of this locality sufficiently lucrative to enable them to build the city and town which have just occupied our attention."

The Beni Gharrah Bedouins, who are the rulers of the country, inhabit the mountains, which they prefer to the hotter Tehamah, or plain, and wander from spot to spot, as pasture serves for their cattle and flocks. They employ themselves during the S.W. monsoon collecting gums, which they barter to the people of the plain, whom they visit for that purpose immediately before the feast of the Ramazan. They seldom eat meat, as they value the milk of either camel, cow, or goat too highly to kill the females: the males of the two latter they frequently dispose of on the coast for rice, dates, &c.

They are a fine, athletic race of men, and expert with their arms, which are the match-lock, yambe, and short straight sword; some are armed with a piece of very hard, heavy wood, which they throw with great precision as far as 100 ft., at which distance they could kill a man. This weapon is thrown so as to rebound along the ground, and every lad carries one in his hand.

The Beni Gharrah Bedouins have a great hatred towards Europeans. A party of officers and seamen of the surveying vessel, *Palinurus*, on their return from Ras-al-Ahmar to Bunder Risoot, where they had been for the purpose of taking observations, were fired upon by some of them, while under the protection of one of the tribe; a breach of faith before unknown. On another occasion, a year after, one of the boats of the same vessel, while sounding in Bunder Risoot, was fired at, the ball passing through the side. Extreme caution is therefore necessary in all dealings with them.

BUNDER MERBAT, or MERBAT BAY. Merbat town is situated about the centre of the Bay, close to the beach, and about 2 m. from the cape: it consists of thirty or forty mud and stone houses, with a population of about 200 souls, who are very friendly inclined towards the English. To the N. of the town is a tomb. Around the houses are ruins of others of a more ancient date, from which the newer ones appear to have been constructed. This is commonly the case with villages on this coast. The original material appears to have served for ages, and in the walls of a miserable habitation may frequently be found stones which have had a better place.

Merbat is the principal trading town of the province of Dhofar: the exports are frankincense and gum-arabic, which is collected here from the Bedouins, and varies very much in quantity, being 3,000 to 10,000 mans (in 1835) annually. The weight used is the man, which is equal to the weight of forty-eight German crowns, the current coin of the coast. The trade is mostly carried on by barter, they receiving rice, dates, cotton cloths, &c., in exchange for their gums. The Sheikh levies a duty of 10 per cent. on all exports, and 5 per cent. on imports.

Supplies. Very indifferent brackish water, fire-wood, and a few bullocks and goats may be obtained here. Merbat is a common place for vessels sailing along this coast to water at, although the water is so brackish that it is hardly drinkable, at least to those who have been accustomed to better; but about 4 m. W. of it, there is a mountain rivulet of excellent water, which, descending to within a few hundred yards of the shore, enables vessels to replenish their tanks there.

Anchorage. The best anchorage is off the town, in 8 or 9 fathoms with the point bearing S. This is quite exposed to S.W. winds, but it is doubtful whether they blow home with much force at Merbat under the Jebel Doan, or Merbat Peak, 3,690 ft. above the sea, which is the W. brow of the high range of lime-stone mountains, Jebel Sabhan. During the prevalence of the strong winds called *belat*, which are experienced in Kooria Moorja Bay, and to the W. of Merbat, a strong S.E. wind will be found blowing over Merbat during the day, and light and variable airs during night. Rain seldom falls at Merbat, but to the W. the mountains and valley of Dhofar experience a great deal.

BUNDER NOOS is a small anchorage formed by a slight concavity of the coast, between the point of Ras Noos, and a slight projecting point called Ras Samhor, affording shelter from S. and W. winds. The anchorage is close to the shore, there being 9 fathoms water about 500 yards off. Close to the anchorage is a spring of good water, sufficiently abundant to supply two or three vessels in one day, and may be known by a grove of date-trees near to it. Fire-wood is procurable from the ravines in the neighbourhood.

Bunder Hasek, about 8 m. to N. of Ras Noos, affords shelter from S.W. winds. The ruins of the ancient town of Hasek are in a valley proceeding from Hasek Bay up the Wadi Rekot. This valley gives its name Khor Rekot, an inlet of the sea, which (now a marsh, separated from the sea by a ridge of sand) once existed in the valley of Hasek, and in all probability formed the ancient port, as its waters would almost wash the base of the old ruined town. A few stunted date-trees are scattered over its surface, and the bed of the valley higher up is densely filled with acacias, tamarisks, and other small trees. The slopes of the mountains produce the luban, or frankincense, which is collected in small quantities, in the proper season, by the Bedouins.

The coast here presents a very striking scene; the unbroken face of the lime-stone mountains,

with the sharp peaks of the granite ranges, one of which, *Jebel Habarid*, attains the height of 4,000 ft., are very grand; yet it has a most wretched appearance from the sea, not a particle of vegetation being perceptible to the eye. On shore, however, the valleys are found to be well wooded, having either wells or a rivulet of fresh water.

GUBET-al-DHUM, a bay on the W. side, and within *Kooria Moor* Bay, has *Ras Hasek* for its S., and *Ras Montejib* for its N. boundary. The coast is irregular and indented, with a sandy cove fronting *Wadi Rekot*; thence around the bay,—with the exception of a sandy spot 7 m. N. of *Ras Therrar*, fronting a valley, where there is a pool of water,—is high, precipitous, and tabular, containing three conspicuous valleys, the principal of which, *Wadi Rekot*, is said to extend to the confines of *Hadramaut*, having the peak of *Habarid* and the *Sabhan* range of mountains as its S. boundary. The soundings in this bay are regular; the 10-fathoms line being nearly 1 m., and the 20-fathoms line 3 m. off the shore. Some shelter from S.W. winds must be had abreast of *Wadi Rekot*.

The valley appears to be thickly wooded and well watered. The breadth of the water-course, and the huge masses of rock that have been swept down it, fully denote a strong torrent after a heavy fall of rain. At the entrance to the valley are a spring of fresh, and a lake of brackish water.

Ras Minji, a slightly projecting bluff, nearly 700 ft. high, is 10½ m. to the E. of *Ras Shuwamiyah*, and due N. of *Halaneesa Island*; close to the E. of it, is a pool of fresh water near the sea. This cape forms the boundary between the *Gharrah* and *Jenebeh* tribes. The soundings between *Ras Shuwamiyah* and *Ras Minji* are bold, with overfalls. There are no villages on the coast of this extensive bay, and but few inhabitants, who live in excavations of the rocks, and subsist entirely on fish. A few are to be found near the lake by *Ras Karwao*, who will assist in procuring wood and water for a vessel.

The people and trade of *Maseera Island* and *Maskat* are described under those names.

NAVIGATION, AND WINDS OF ARABIAN COAST.

In these days, when the value of time is better known, the passage along this coast, from the Red Sea to *Ras-el-Hadd* or *Maskat*, against the N.E. monsoon from Oct. to March, should not be undertaken by sailing-vessels. Many instances have been known of ships taking sixty and even ninety days on a voyage from *Aden* to *Bombay*.

The S.W. Monsoon. On the E. coast of Arabia, from *Kosair* to *Ras-el-Hadd*, the S.W. monsoon sets in late in May, and ceases towards the end of Aug.; it is much more moderate than in the other parts of the Arabian Sea, the wind seldom exceeding a good fresh breeze by day, and lulling at night, and the swell is not so great as that experienced in the open sea and approaching the W. coast of India; the sky is generally clear, but weather hazy. S. winds will frequently set in early in March, and blow very fresh; these must not be mistaken for the monsoon, as they are followed at the end of the month and in April by light and variable winds along the whole line of coast. May is a doubtful month. Should the monsoon set in early it will blow fresh, otherwise moderate weather will be experienced.

The S.W. monsoon is in its full force from mid-June until the end of Aug. It blows strongest, and the sea is heaviest, on that part of the coast between *Ras Merbat* and *Maseerah Island*, especially in *Kooria Moor* Bay, and particularly in the month of July. During these months the Arabs do not venture to sea; the larger boats run up the coast early in June, after the first burst of monsoon, and also towards the end of Aug., when they consider the monsoon to be over.

In the vicinity of *Kooria Moor* Bay, the S.W. monsoon sets in with a gale of wind, thunder, lightning, and rain. This is the only part of the coast feared by the native navigators, there being no place of shelter to run for, except under the lee of the largest of the islands, and may be considered one of the stormiest portions of the Arabian Sea. In May, 1503, the commander of the Portuguese East India fleet was wrecked on the *Kooria Moor* Islands during a gale. In 1853, H.M.S. *Juno* was nearly dismantled in a violent gale off the islands. The mail steamers of the Peninsular and Oriental Company were compelled to abandon the N.W. passage from *Bombay* to 'Aden, owing to the tempests on this part of the coast, although it promised a more rapid passage in June, July, and Aug. than the S. route formerly taken. The P. and O. Company's steamer *Malta* suffered much during a violent gale S. of *Kooria Moor* Bay. The E. I. Co.'s steamer *Queen* was nearly lost in the middle of April, 1855.

In the month of Sept. the winds are moderate from the W. and S. In Oct., light variable breezes and calms prevail; near the shore, land and sea-breezes are sometimes experienced, and occasionally, at night, a passing shower of rain. As a general rule, rain seldom falls on this coast, except in the province of *Dhofar* and in the Gulf of 'Aden; but heavy dews may always be expected.

The N.E. monsoon. On the E. coast of Arabia light and variable winds are experienced during Oct. In Nov., between the island of Maseerah and Ras-el-Hadd, light land winds of short duration, and sea-breezes from S.E. to S., generally prevail; but to the S. and W. of Maseerah land-winds are rare. A strong breeze from N.E., with a short chopping sea, is by no means unusual during this month and early in Dec., and is always looked for by the native navigators. During the months of Dec., Jan., Feb., and part of March, the N.E. monsoon blows along it, varying with the direction of the coast-line. At a distance from the coast it is from N.E. to E. with clear pleasant weather, and free from squalls and rain; but near the coast the atmosphere is generally hazy, particularly when land-winds are blowing. Fogs are also prevalent in the vicinity of Gubet Hasheesh and the Gulf of Maseerah.

Strong land-winds, called by the natives **Belat**, may be expected from mid-Dec. till mid-March, between Ras Seger and Maseerah Island; they blow from N. to N.N.W., and last from one to three days, and at times even as long as seven days. Their approach is generally indicated by a faint hazy arch over the land on the previous evening, or by the wind veering towards the land, sometimes in sudden gusts, early in the night. They nearly always set in between midnight and 4 h. a.m., commencing with a light breeze, and increasing to a moderate gale in about an hour, blowing hardest (as the land-winds blow on Sind and Cutch coasts) between 9 p. m and 9 a. m., and usually cease about noon, as suddenly as they commenced. They are very dangerous to vessels that may happen to be close in-shore, where they will occasionally, during the night, die away to a calm, and remain so about an hour, when heavy gusts will blow down from the mountains, at intervals of a few minutes, succeeding each other for five or six hours. Off shore, a high sea is raised by these winds. In some years, they may seldom occur, while in others they are frequent and very violent. Belats are frequently succeeded by strong S.E. winds, which bring with them a very considerable swell.

The winds and weather in the bay of Kooria Mooraa, appear to be more boisterous and variable than on any other part of the coast; the belats are more furious, and gales from S.S.W. are common during Feb. and March; the changes of wind are sudden, and give little or no warning. The atmosphere is always hazy during the belats. About Maseerah S.E. winds are more prevalent than any others in these months, varied occasionally with a moderate N.-Easter. Fresh S. breezes, of two or three days' duration, may be experienced occasionally in the Gulf of Maseerah.

From mid-March till end of April, the winds are light and variable along the whole coast; land and sea-breezes are felt in-shore. To the N., about the Gulf of Maseerah to Ras-el-Hadd, N.E. winds become lighter, and S.E. and S.W. winds more frequent. As mentioned above, fresh S. winds may frequently set in on the Arabian coast early in March, but must not be mistaken for the S.W. monsoon.

CHAPTER XI.

THE PERSIAN GULF.

GULF OF OHMAN—MASKAT—DAIMANIYAH ISLANDS—SOHAR—RAS MUSANDIM—THE QUOINS—RAS-EL-KHAIMAH—SHARGEH—SEIR ABOO-NAIR—ABOO ZHABI—THE PEARL BANKS—BAHREIN—EL-KATIF—EL-KOWAIT—BUSSORAH—RAS JASHK—BUNDER ABBAS—HORMUS—EL-KISHM—THE TUMBS—BU-MOOSA—FAROO—EL-KAIS—SHEIK-SHUAIB—SHAH-ALLUM SHOAL—RAS NABEND—CONGOON—BERDISTAN BANK—BUSHIRE—KHARG ISLAND—DILAM BAY—KHOR MOOSA—SHAT-EL-ARAB—KHOR ABDALLAH—GENERAL DESCRIPTION—NAVIGATION—COAST OF BELOOCHISTAN.

(VARIATION AT MASKAT, 1° W.; AT CENTRE OF PERSIAN GULF, $1\frac{1}{2}^{\circ}$ W.; AT BUSSORAH, 2° W.)

Introduction. With a description of the Persian Gulf in this Chapter, it has been thought convenient to include the Gulf of Ohman, or 'Oman, with the approaches to it from Maskat on the S.; and then the Beloochistan or Mekran coast, with that of Lus, from Ras Jashk to Ras Muari, near Karachi, the N.W. frontier of our Indian Empire.

The Batineh coast, from Maskat to Khor Kelbeh. The whole of this coast is free from danger, excepting the Deimaniyeh Islands, and has no harbours, or even creeks, that will admit anything but the smallest boats. It is quite open to the Shemal and Nashi; for the latter, it is a dead lee shore; and consequently all the trade with Maskat is carried on in small boats, which can be hauled up in bad weather. A vessel would be able to obtain cattle, poultry, and vegetables at all the towns. *Water*, though plentiful, would be tiresome to wait for, unless she used her own boats. It is obtained from wells, often sunk only a short distance from the beach. Fire-wood only to be had in limited supply. Quantities of dates, which are very fine, are exported from this coast. From Ras Maskat to the end of Seeb date-groves, 25 m., W. by N., forms a sandy bay called Gubet-el-Heil; its E. point being called Ras-el-Hamar, or the red cape, which is 2 m. to S.S.W. of Fahl islet, and 150 ft. high. The *white* cape, El-Abyath, is close to W. of Hamar.

Fahl Islet, in lat. $23^{\circ} 41' N.$, lon. $58^{\circ} 30' E.$, lies 2 m. off Ras-el-Abyath, is $\frac{1}{2}$ m. in length, with a clear passage between it and the main, with 10 and 12 fathoms, deepening to 20 close to the island, and which is 280 ft. high and is visible 18 m.

The hills recede from Maskat to the S.W., increasing in height till they culminate in Jebel Tyin, 5,250 ft. high, 22 m. from Maskat; they are not remarkable in form, but one of the lower mountains of the range, about 4 m. from the shore, is of white colour. Then there is a great valley, Wadi Sumayel, between this range and the Nakhl range, 7,740 ft. high, which lies in a N.E. and S.W. direction from Seeb: it has four principal peaks, one of which, Jebel Nakhl, 7,000 ft. high, is singular in form, like a pepper-box on the top of the mountain; it is seen off Maskat, but afterwards gets shut in behind the other peaks, and is not again seen till near Birkeh: these mountains are visible 90 m. **Seeb** is a scattered town, chiefly built of mat huts; several boats belong to it. There is a bazaar, and two small detached forts, also extensive date plantations and many gardens. It is frequented in the summer by visitors from Maskat, who erect temporary houses. The ruler of Maskat is often here for change of air, this place being healthier and less hot than Maskat, and more open to any breezes. It is governed by a wali or deputy.

Suadi Point is $45\frac{1}{2}$ m. W. by N. of Ras Maskat. After passing Seeb, the great bluff of the **Jebel Akhthar**, 9,900 ft. high will be seen; it is visible 100 m. in very clear weather. There are lower ranges between it and the sea. The coast continues low and sandy, projecting a little W. of Seeb, with date-groves nearly all the way. The Deimaniyeh Islands are in three groups, and lie nearly parallel to the coast, at about 8 m. distance.

Birkeh Town, bearing S.E. $\frac{1}{2}$ E. $7\frac{1}{2}$ m. from Suadi Point, contains few houses, and is dilapidated; in the centre is the sheikh's castle, a lofty Arab fortress, which is visible 10 m., and strong for such a building. The country is well cultivated near the town, which, like Seeb, is under a wali. There is a large bazaar, and some Banyans are settled here. Suadi Point is low and sandy, with a sand-hill. Off it lies the **Suadi group** of islands, which consists of one large islet, and six

smaller ones, extending $1\frac{1}{2}$ m. E.S.E. and W.N.W. The largest, or E. islet, 280 ft. high, in lat. $23^{\circ} 48' N.$, lon. $57^{\circ} 48' E.$, is $\frac{1}{2}$ m. long, E. and W., and $\frac{1}{2}$ m. broad; it is table-topped, has cliff, all round to sea-ward, and is visible 18 m. It is separated from the land by a strait, $\frac{1}{2}$ m. wide, fordable at L. W. The other islets are all precipitous, from 50 to 150 ft. in height. The S. and largest of the six, has a tower on it, built to protect the anchorage in the pirate times; between this tower islet and the shore is a **small boat harbour**, about $\frac{1}{2}$ m. in extent, with 2 fathoms close to the S. side of the tower islet, where native vessels anchor, partly sheltered from the prevailing winds. This little place is crowded with boats in the date season; the entrance is close round to the S.W. of Tower Islet. There is no danger outside these islands, and there are 4 or 5 fathoms quite close to; the bank of soundings outside them is not more than 9 m. broad.

Soundings. There is no danger on the coast. Off Maskat, the bank of soundings is not more than 3 m. wide, but it widens to the W., and is about 15 m. broad at Seeb. The 20-fathom line runs from Ras Shateif nearly straight to Fahil Islet, and thence is about 3 m. off shore till near Seeb, where the flat, near the edge of which the Deimaniyeh Islets lie, begins. The bottom is mud and sand, above 20 fathoms, chiefly mud. The bank of soundings extends 5 or 6 m. to the N. of these islands.

DEIMANIYEH ISLANDS, called by Arab seamen also Sabah Jezayir, are all quite barren, and there is no water on any of them. They are frequented by fishermen from the main land, who come over in small boats called beddan, and catamarans called shasheh, made of date-stalks.

The E. of the three groups, named **Kharabat**, in lat. $23^{\circ} 51' N.$, lon. $58^{\circ} 11' E.$, has a reef on its N. and E. sides, extending about $\frac{1}{2}$ m. off; and 20 fathoms within $\frac{1}{2}$ m. Its highest part, about 25 ft. high, is visible 8 m. The bank of soundings extends only about 4 m. outside this island: there are 22 fathoms close inside it, shoaling gradually towards the main. The channel between this and the centre group is 3 m. wide, and quite safe, with 20 fathoms and upwards.

Deimaniyeh was the name more particularly applied to the centre group, which now on the latest charts is called **Jezirat Joon**, extending nearly E. and W., $8\frac{1}{2}$ m.; it consists of seven islets of different sizes, in a row, with some detached rocks. Their height is from 30 to 40 ft., and they are visible 9 m. There is no danger near this group, which is steep-to, with low cliff, of light brown colour, and difficult to see at night. If passing inside, the soundings would be no guide approaching them; there are not more than 14 fathoms between this group and the shore. One mile off the N. side there are 30 fathoms, and no bottom at about 4 m. off. The channel between this and the W. group is 4 m. wide, with 20 fathoms in it, and quite clear.

Jezirat Barkah, the W. group,* consists of one islet, and three rocks above water, extending in a straight line E. and W. $1\frac{1}{2}$ m. The large islet, 107 ft. high, is of light brown colour, and difficult to see at night; by day it is visible 12 to 13 m. The depth inside this island is 14 fathoms at $\frac{1}{2}$ m. off, decreasing towards the main. Outside there are 20 fathoms at $1\frac{1}{2}$ m. off. **Clive Bank**, bearing W.N.W. $1\frac{1}{2}$ m. from the high islet, is a detached sunken patch, least water 9 ft., coral rocks, and 20 fathoms within $\frac{1}{2}$ m. on the N. side. This patch shows plainly from aloft, when the sun is behind the vessel.

THE COAST from Suadi to Khor Kelbeh is low and sandy, not seen more than 9 or 10 m., quite free from danger, and is little visited by Europeans. There are many towns and villages, and the date plantations are almost continuous close to the sea. Its general direction is about E. and W., near Suadi, thence curving round by the N.W., till it lies N. and S. at Khor Kelbeh.

The great range of mountains appears to be continuous from the Jebel Akhthar to the entrance of the Persian Gulf; it is visible from the sea its whole extent, and gradually approaches the coast to the N., leaving only a narrow plain opposite Khor Kelbeh. The survey of this part of the coast is very imperfect. The 100-fathom line is 9 m. from the coast at the Suadi Islands, increasing to 18 m. off Khor Kelbeh; the soundings appear to be quite regular. The first town of any size, Suwaik, at 20 m. W. by N. from Suadi Island, has a large fort in the centre; there are also many huts without the walls. It is under the wali of Birkeh, and has a garrison of the sultan. El-Khabureh is a town 20 m. to the N.W. of Suwaik. At 25 and 20 m. to the S.W. of this place are two hills, which are conspicuous as land-marks: a high bluff, quoin-shaped hill, about 3000 ft. high, and on the lower jagged range, an Ass' Ears Peak. Between Suwaik and Sohar, there are a dozen villages, of which Saham is the largest.

SOHAR, a large town, in lat. $24^{\circ} 22' N.$, lon. $56^{\circ} 46' E.$, 67 m. from Suadi, is under a wali, and contains 4,000 or 5,000 inhabitants. A conical peak, 1,550 ft. high, standing $12\frac{1}{2}$ m. W.S.W. of the town, is a good mark for finding the place long before the low shore was in sight. The town

* This is called Jezirat Jun by Captain Constable, but many of his names have been materially altered in the Admiralty charts of this year, 1872.

is walled, with a high fort in the middle, the residence of the sheikh, which is seen after all the date-trees are below the horizon, or about 12 m. The anchorage is in any convenient depth abreast the town. There are 5 fathoms, sand, one mile off. The date-groves are quite continuous on this part of the coast. **Shinas** is a considerable town with a strong fort, 27 m. to the N.W. of Sohar. The British force against the pirates, in 1809, took this fort by assault, after a determined resistance. **Khor Kelbeh**, a village and fort with about 200 men, lies 19 m. to N. of Shenah; there is a creek into which boats go at H. W.; 5 m. S. of this, near a village called Murrir, the Batneh coast ends.

The Coast from Murrir to Dibba is called **Es-Shemiliyeh**: this part of the coast is at present under the government of the Joasmi chief (Sultan-bin-Suggur, of Julfar.) The plain becomes narrower, and 15 m. N. of Khor Kelbeh the hills come close down to the sea. The general direction of the coast is N. $\frac{1}{2}$ E. 35 m. to Ras Dibba; from thence it trends W. about 5 m. to the town of Dibba. The mountains are high close to the sea; the coast-line, cliffs with sandy bays, in which are villages and date-groves.

Soundings. There is no danger off this part of the coast, the depth being 30 fathoms 2 to 3 m. off, shoaling regularly but quickly towards the land. The 100-fathom line from opposite Khor Kelbeh runs across to Ras-el-Kuh (on the Persian coast), and to the N. of this line the soundings are all under that depth; 50 fathoms being 9 m. off shore at Khor Kelbeh, and probably only 5 m. at Ras Dibba. Off Ras Musandim, there is a little gut with more than 100 fathoms.

Khor Fakan, a village with a large date-grove, in a sandy bay, 15 m. S. of Ras Daba. The S.E. side of this bay is formed by a projecting mass of hills, 1,000 to 2,000 ft. high. There is a peaked islet 240 ft. high, off the N.E. point, with a deep water channel 2 cables wide, inside it; but, from the E., it is not easily distinguished from the land behind. Above Khor Fakan the shore is low and sandy for several miles, with date-groves and villages, the mountains being at a short distance from the shore. Bideeyah is a village with an islet off it, in lat. $25^{\circ} 25' N.$, lon. $56^{\circ} 28' E.$, about 4 m. to N. of Khor Fakan. Excellent water may be got at Khor Fakan.

DIBBA or DABA BAY. Ras Dibba is a projecting point of cliffs of moderate height, having a small islet $\frac{1}{2}$ m. off, in lat. $25^{\circ} 37' N.$, lon. $56^{\circ} 23' E.$, with a channel of 2 to 3 fathoms behind it. Dibba Bay is 5 m. across, and open from N.N.E. to E.; the soundings decrease regularly from 15 fathoms to the sandy beach. The town and fort are 5 m. W. by N. of Ras Dibba, and contain about 2,000 men; there are very extensive date plantations in the valley on the S. of the town. Good water may be obtained here, and supplies of cattle, vegetables, &c.

DIBBA to the QUOINS. The country N. of a line drawn from Dibba to Ras-al-Kheimh, forms a great promontory, called Ruweis-al-Jebal (caples of mountains.) It is under the Maskat government as far as Khasab, thence to Ras-al-Kheimh under the chief of the latter place. The inhabitants of this district are chiefly of the Shaihin tribe; they are extremely poor, quite inoffensive, and are herdsmen or fishermen; during the date harvest they are absent from their home, being employed either in Batneh or Khasab, &c. Their huts are frequently built up the sides of the hills, where the children may be seen tied up by the leg, to prevent their falling over the cliffs.

From Ras Dibba, the N. point of Musendom Island bears N. by E. 47 m. The coast-line of this (as of the other side of the promontory) is singularly indented into numerous deep-water inlets, some of great extent. In all these coves the winds are very baffling, and in consequence a sailing vessel would find it difficult to enter or leave them; the great depth of water in most of them is a further difficulty, rendering it tedious to attempt warping. The larger Arab vessels never visit these coves, nor any vessel that cannot be propelled by oars; if a ship should happen to enter one, the best time to attempt to get out would be at night, when a light land-wind often blows out of the inlets. The coast is throughout precipitous, and the cliffs generally overhang, being worn away by the action of the water; with a few sandy bays at the mouths of the valleys, and the mountains rise abruptly from the water's edge. The whole of the shores are quite barren, except in a few little valleys where date-groves, &c., are found. The inlets, enclosed by these bare, precipitous mountains, have a most romantic appearance; among the mountains are many wolves, leopards, and foxes. The paths across these mountains are generally tracks fit only for goats or Arabs. Seen from the E., the range of mountains has two principal peaks, of which the N. one, called Shuam Peak, 6,750 ft. high, is the highest, in lat. $25^{\circ} 58' N.$, lon. $56^{\circ} 15' E.$ The other, Jebel Kewa, 5,800 ft. high, is a grand peak, with a small notch in the top; these are visible 80 or 90 m., or from Ras Jashk on the E., to Lingeh and Basidub on the W. side.

SOUNDINGS. There is no danger off this part of the coast: 40 fathoms are about a mile off shore below the islet Uhm-el-Fiyarin, and 60 to 65 fathoms, or the deepest water in this part of the gulf, at 10 m. off. Above that islet the deepest water, viz. 70 fathoms, is quite close to the points, and just off Musendom Island 80 and even 100 fathoms: the water shoaling to 50 and 40 fathoms half-way across to the Persian coast.

Duhet Hafah is a cove running in parallel to the coast for $2\frac{1}{2}$ m., and varying from $\frac{1}{2}$ to $\frac{1}{4}$ m. in width; the soundings in it are 7 to 8 fathoms, and quite regular. The strip of land forming its E. side quite masks this cove from seaward, so that a stranger would not suspect its existence: it forms a land-locked harbour. There are only a few fishermen here. Khor Mahleh is a small cove $8\frac{1}{2}$ m. to the N. of Ras Hafah; and **Duhet Sharhah** is an indentation of 8 m. N. of Ras Hafah; it is open to E. winds. Close to the S. of this cove, and separated from it by a promontory $\frac{1}{2}$ m. wide, is another cove a mile deep, opening out at its inner end to $\frac{1}{2}$ m. in width; the soundings are 12 fathoms in the entrance, and decrease regularly. There is a small village and date-grove at the head, on the S. side. There are several other small indentations between this and Khor M'aleh, or Mahleh.

The coast runs in a N.N.E. direction for 3 m. above this cove, and then falls back, forming the S. point of Gubet 'Akabeh. It is quite precipitous, with a peak (about 2,000 ft.) rising near the shore, which, when viewed from the N., forms a fine cone; it is called Limeh Peak on the chart. Behind it is a saddle mountain, somewhat higher, also conspicuous from the N. From the E. these two hills do not show against the higher land behind.

RAS LIMEH, 285 ft. high, a narrow precipitous point, 27 m. S. $\frac{1}{2}$ W. of Ras Musendom, projecting 1 m. from the line of coast. Off it lies a high precipitous island, 285 ft. high, called Jeziret Limeh, in lat $25^{\circ} 56\frac{1}{2}'$ N., lon. $56^{\circ} 29'$ E., with a channel, $8\frac{1}{2}$ cables wide, between it and the point. There are 20 fathoms in this channel, and a small detached rock near the island; the tide sets strong through it. The depth is 30 fathoms close to outside the island. Gubet Akabeh is a deep bay to the S.W. of Ras Limeh, with soundings in it decreasing regularly from 20 fathoms. In its N.W. corner is a small village, called Akabeh, or Limeh Kedimeh. Close in to the village, boats find shelter from the N.-Easters, which are the worst winds on the coast. To the N. of Ras Limeh is a sandy bay, a mile in extent, at the mouth of a valley, in which is the village of Limeh, containing about 200 men. The anchorage, open from E. to N.E., is in 11 to 12 fathoms. The best landing-place in E. winds is on the S. side of the bay, close to the cliffs, in a little bight used by the native boats. Cattle, &c. are procurable here; good water not obtainable in any quantity, except perhaps from a distance. Fire-wood could be got by waiting a day or two. The mountains in-shore of this part rise suddenly to great heights.

The coast from Limeh runs N. for 5 m. to the S. entrance point of **Duhet Kubal**, or **Kabir**, a fine cove, a mile broad at the entrance, running in 2 m. W., and then turning to the S. for another mile, with a sandy beach at the head. Its outline is very indented, with little beaches in the bays; the points all cliffs. Close on the S.W. side the mountains rise like a wall, forming a tremendous bluff, over 4,000 ft. high. The soundings decrease from 28 fathoms at the entrance to 13 fathoms at the bend, and thence regularly to the head. This cove is frequented by fishermen from Limeh, and a few poor herdsmen live in huts scattered over the valley at the head. From the N. entrance of the cove, the cliffs run N.E. 3 m. in an unbroken line, of irregular height and deeply furrowed, decreasing in height to the N., and terminating at Ras Sirkan, a perpendicular cliff several hundred feet high, forming the S. entrance point of Gubet Ghazireh. There are 40 fathoms within $\frac{1}{2}$ m. of this point.

GUBET GHAZIREH, or **MALCOLM INLET**, is an arm of the sea, nearly 3 m. wide at entrance, between Ras Sirkan and Ras Della, and $8\frac{1}{2}$ m. deep in a W.N.W. direction. Its shores are throughout precipitous and high, except in a few little sandy bays at the bottom of valleys, and are deeply indented into numerous smaller inlets and coves; the length of its coast-line being about 40 m. The soundings are deep all over, 36 to 30 fathoms in the main inlet, and 25 to 20 in the smaller coves, 20 fathoms even being close to the cliffs; the bottom chiefly mud and rocky at the entrance. There are two principal branches on the S. side. On the N. side are also two large coves, each $2\frac{1}{2}$ m. deep, separated by a high and rugged peninsula.

Telegraph Station. The N. side of the inner cove is separated from Khor-es-Shem, or Elphinstone Inlet, (on the other side of Ras Musendom) by a low ridge from $\frac{1}{2}$ m. to a mile wide. At the bottom of the outer one is the village of Fillam, built on an isthmus only 100 yards in width, separating this cove from Gubet Shabus.

The Indian Telegraph Cable is laid from Bushire to a small island half-way up Elphinstone Inlet in the Persian Gulf, which has an establishment connected with the cable and a Telegraph Office upon it. The cable from this island is taken to the shore and across the narrow neck of land dividing Elphinstone and Malcolm Inlets, down Malcolm Inlet and on to Kurrachee. Ships in the gulf of Ohman wishing to telegraph to Bushire or Europe, would save time by proceeding to Malcolm Inlet, and sending across the neck of land in the direction of the telegraph-posts, and hailing for a boat from the island. The distance across this narrow neck is less than 1 m.

Caution. Ships anchoring should be careful not to drop their anchors on the cable, but

anchor in 20 or 25 fathoms, about half-way between the telegraph posts and the Arab village to the N., which is called Magaufer, or Magahgeh.

Tide. It is H. W. at F. and C. in the inlet at 9 h. 30 m; rise and fall 10 ft.

Ras Della, or Dalley, 200 to 300 ft. high, the E. point of the high peninsula commencing at Fillam Village, is a perpendicular cliff, having a conical summit. The peninsula is 5 m. long, and has a remarkable brown-coloured peak, over 1,000 ft. high, with a little round knob on the top, on its widest part. It separates the inlets Ghazireh and Shabus. The soundings off it are irregular, 30 to 45 fathoms.

Gubet Shabus, or Bradford's Cove, is 3 m. wide at the entrance, and runs in a W. direction for $2\frac{1}{4}$ m., then turns to the N. for 2 m. The soundings in it are from 35 fathoms in the centre to 20 or 30 fathoms close to the sides. The shores are high cliffs, with little sandy beaches in places. The village of Shabus is in a little bay on the S.W. side. In the N. part are two small hamlets. This cove is separated from Duhet Shisheh by a high peninsula 4 m. long N. and S., at the narrowest part of which the two inlets are only 1 m. apart. The E. point, forming the S. entrance point of Duhet Shisheh, is called **Ras Keiseh**, and is similar to the last; a small islet lies $1\frac{1}{4}$ cables off it. The Arabs say there is a small reef near the shore, not far from this islet, called Abu-l-Muwar, with 1 fathom on it. The soundings off these points are 30 fathoms close-to, and 70 about 1 m. off.

Duhet Shisheh, or Combermere Cove, is a fine bay 6 m. deep E. and W., and $4\frac{1}{4}$ m. wide at entrance, with 35 to 40 fathoms all over it, and 15 to 20 fathoms close to the cliffs. Its coast line is precipitous and irregular with some little sandy beaches in the coves. There are three islets half-way in on the N. side, the largest of which is about 100 ft. high. The village of Shisheh, with about 200 inhabitants, stands in a cove on the W. side or bottom of the inlet.

The W. side of this cove also is separated from Khor-es-Shem, or Elphinstone Inlet, by a ridge, in one part about $\frac{1}{2}$ m. wide.

JEZIRAT UHM-EL-FIYARIN, formerly called **Fillam Rock**, in lat. $26^{\circ} 11' N.$, lon. $56^{\circ} 33' E.$, is a rocky islet S.E. $\frac{1}{2}$ S., $4\frac{1}{4}$ m. from Ras Keiseh, and $3\frac{1}{4}$ m. off the nearest part of the land; it is 360 ft. high, $\frac{1}{2}$ m. long, and visible 22 m. off. It is of light colour, precipitous on the W., and barely accessible on the S.E. side. The soundings near it are 60 fathoms on the E. side, and 40 to 45 between it and the shore.

The tides are very strong near this islet; and from this, round Ras Musendom and the Quoins, so strong, with eddies and races, especially near the cape, as to render it desirable for a sailing-vessel not to approach the coast, unless obliged; particularly as the wind is very uncertain near the high land, often dying away, or coming suddenly from the opposite quarter. The tide runs N. and S. along the coast to Ras Musendom, where it sets to the N.W. towards the Quoins, and E. and W. towards Ras Shariteh.

Ras Jabrin, or Kabr Hindi (Indian's grave), about 1,200 ft. high, is a quite precipitous cape, with three scollops on the top; the depth is 60 fathoms $\frac{1}{2}$ m. off. Between it and Keiseh Point is the entrance to Duhet Shisheh. This is the E. point of the Ruweis-al-Jebal, and only 30 m. distant from the Persian coast E. of it.

ISLANDS AND ROCKS ROUND RAS MASANDIM.

RAS MASANDIM is the N. point (about 100 ft. high) of **Musendom Island**, the highest part of which is 875 ft. high, and precipitous all round, excepting three or four little coves on the E. side, the only landing-places. The island is nearly 2 m. long N. and S., and $1\frac{1}{4}$ m. broad at the S. end. There are some remains of buildings on the N. part, built of large blocks of stone without mortar, similar to those at Kubal. There are a few herdsmen generally here, with their flocks of goats: the whole of the coasts about this part are frequented by fishermen from Kumzar. The soundings are 100 fathoms close to the N. and E. of this cape, being the only spot N. of Ras-al-Kuh where such a depth is obtained.

Kuchul Islet, 100 ft. high, in lat. $26^{\circ} 24' N.$, lon. $56^{\circ} 32' E.$, is a little islet or pillar of rock, $\frac{1}{4}$ m. N.N.E. of Ras Musendom, with a clear passage between them, and as deep water as at Musendom. Near this islet the tides are at the strongest, with broken water; the noise of the races may be heard some distance in calms. To the E. of Kuchul Islet, for more than 1 league, the soundings are over 100 fathoms. Anchorage hereabouts is impossible.

Musendom, or Masandim Island, is separated from the main by a strait, called by the natives the Bab, or Fak-el-Ased, (the Lion's Jaw) 3 cables wide, and quite clear, with 24 fathoms in it. The point of the main opposite, called Ras-al-Bab, is about 3 m. N.N.W. of Ras Kabr-Hindi, with a deep bay between; it is quite a perpendicular cliff, about 200 ft. high. This channel

has occasionally been used by steamers; but great attention must be paid to the steerage. Owing to the strong tides and baffling winds, it is not safe for sailing-vessels. The Arabs only venture through in rowing-boats.

SELLAMEH WA BENATHA, called by English sailors the Quoins, are a group of three remarkable islets, the largest of which, called the **Great Quoin**, or **Sellameh**, 450 ft. high, bears N. $\frac{1}{4}$ W. 7 m. from Ras Masandim, and is visible in clear weather 27 m.; in lat. $26^{\circ} 30' N.$, lon. $56^{\circ} 31' E.$ From it the highest part of the Little Quoin bears S.E. $\frac{1}{4}$ S. 2 m., and the peak of Gap Island E. by S. $\frac{1}{4}$ S. 4 cables. The **Little Quoin**, 168 ft. high, is also quoin-shaped, but has a more gentle slope on top than the Great Quoin; the highest bluff is to the S. It is accessible on the N. side only, off which a small spit runs in the direction of Gap Island. **Gap Island**, the name given to the centre islet, has a peak near the centre, about 250 ft. high, and cliffs all round. The soundings are 45 to 50 fathoms close to Sellameh, and 70 to 80 close to the S. of the Little Quoin, increasing towards Musendom Island.

The Tide sets N.W. and S.E. about the Quoins, 9 knots at springs. It is not recommended to sailing-vessels to pass to the S. of them; the wind is often lost near them, and the tide-races will turn a vessel half round against the helm.

Tawakkul, or **Suweik**, called formerly **Lump Island**, 460 ft. high, is a precipitous islet, and like Sellameh or Great Quoin. The depths are 60 to 80 fathoms at $\frac{1}{4}$ m. off.

Rak Suweik Shoal, at $\frac{1}{4}$ m. to the W. of this islet, is a small rocky patch, 50 yards across, with only 9 ft. on it, and 50 to 60 fathoms close-to. It often has a flock of small birds hovering over it.

Jezirat Koon, or **El-Khail**, is a precipitous island, near 600 ft. high, about a mile long E. and W., with a depression in the centre forming a kind of saddle. Its W. and higher peak is 4 m. W. by S. from Ras Masandim. **Jezirat Abu Sir**, lying off a projecting promontory called Ras Makhalif, is 6 cables long N. and S., and has 40 fathoms close-to on the N. side. It has cliffs all round, and near the S. end a peaked hill about 400 ft. high, sloping down to the N. end. It is separated from the main by a deep strait called Bab Makhalif, $\frac{1}{4}$ m. broad, through which the tides set very strong with eddies; near the mid-channel is a high precipitous rock. The N. point of this island bears nearly W., $5\frac{1}{4}$ m. from Ras Masandim. The **Mishkan Rocks** are several detached rocks or islets close together 15 ft. above the sea, and of white colour, lying N.N.W. of Abu Sir, with a clear passage 6 cables wide, with 20 to 25 fathoms in it, between them and that island. There are 70 fathoms a mile to the N. of them.

Perforated Rock, bearing W. 8 m. from Ras Masandim, and 9 m. to S.W. of the Great Quoin, is a little islet, about 40 ft. high, with perpendicular sides, and a hole through it; whence its name. The Strait or Bab, between this islet and **Ras Shariteh** is only a cable wide, and hardly fit even for boats, owing to the strength of the tides. There are 60 to 70 fathoms within a mile to the N. of this islet, and 30 to 35 between it and the Mishkan Rocks. Between Ras Shariteh and Ras Makhalif are three coves, each nearly a mile long N. and S., with deep water, exposed to N. winds, and with 20 fathoms in the entrance.

To the E. of Ras Makhalif, lies **Kumzar Cove**, upwards of 1 m. deep, and $\frac{1}{4}$ m. wide, at the bottom of which is the town of Kumzar. It contains about 500 men, and is built in a gloomy valley or gorge in the mountains; the water is obtained from a deep well, some distance up the water-course. The inhabitants are fishermen, and have fifty or sixty boats of different sizes; they take their salt fish, shark-fins, &c., for barter to Kesm (at E. and of El-Kishm Island), with which place they have much intercourse.

Jezirat Ghanam, or **Ghunnum**. From Ras Shariteh the coast runs about S. for 4 m., and off it lies this island, which is $2\frac{1}{4}$ m. long, N. and S., by $\frac{1}{4}$ broad, its N. end bearing S.W. $1\frac{1}{4}$ m. from the Perforated Rock. It has cliffs nearly all round: the N. point is low, but it rises gradually towards the S. end, where it is about 600 ft. high, rising over cliffs about 200 ft. high. There are 45 to 40 fathoms $\frac{1}{4}$ m. off its seaward side. The island is barren, without water or inhabitants; but goats are kept here belonging to the Kumzar people.

The **COAST**, from **RAS MASANDIM** to **RAS-EL-KHAIMAH**, forms the N. and W. sides of the Ruweis-al-Jebal. The mountains rise close to the sea, as far as Shuam, 13 m. above Ras-el-Khaimah, when they begin to recede from the coast, and the low shore begins, which is characteristic of the whole of the Arabian coast. The coast N. of Shuam is deeply indented into inlets, with deep water close to the cliffs, which, excepting a few little beaches at intervals, line the entire coast. The sea is everywhere beautifully clear. Seen from the N., when not quite close in, **Jebel Lahrin** (Shuam Peak) is conspicuous over all the other hills, still appearing with a small table-top.

Khor Kawi, the strait between Ghanam Island and the main, is only $\frac{1}{4}$ m. wide at either end,

widening to $\frac{1}{4}$ m. within, with soundings from 15 to 19 fathoms, sand and rock. The tides set strong through the strait, and to the W.S.W. across the entrance. A vessel wishing to enter these straits for shelter, &c., should do so from the N. end, and, bearing in mind the set of the tide across the entrance, round the low N.E. point of the island, anchoring immediately after passing it, in 15 to 17 fathoms, well over on the W. side, close to a little reef about a cable from the shore. It is not recommended as a place of shelter for sailing-vessels, unless in emergency, as at least there would be much difficulty in getting out again. It would be far preferable to cross the Gulf to Henjam or Keesm anchorage; or, in a shemal, if possible, to fetch into Khasab Bay.

Khor Ghub Ali is formed on the S. side of a headland bearing S.S.W. about 1 m. from Ghanam Island. This khor runs in nearly straight $3\frac{1}{4}$ m. to the S.E., with an average width of $\frac{1}{4}$ m. On a sandy beach at the bottom is the small village of the same name, with a few date and other trees, and good water. The soundings are 28 fathoms in, and 30 off the entrance, and 16 fathoms at 1 m. from the head of the cove. The sides of the cove are high cliffs; the N. entrance-point is about 300 ft. high, with a conical hill on the summit sloping on all sides down to the cliffs, forming a headland 1 m. in width, and about 800 ft. high. The bottom of this cove is less than 1 m. from Duhet Shisheh. The cliff at the S. point of Khor Ghub Ali is about as high as that on the N. side; hence the coast runs S. by W. 4 m., to the entrance of Khor-as-Shem.

KHOR-ES-SHEM, or ELPHINSTONE INLET, is an extensive and winding inlet, above 8 m. in length, its breadth in parts being under $\frac{1}{4}$ m.; the coast-line is deeply indented, and there are several islands in it. Its entrance is about 5 m. to S. by W. of Khor Ghub Ali and a mid-channel course should be taken. At **El-Jibbeh Islet**, the entrance to Khor-es-Shem is only $\frac{1}{4}$ m. wide, with 15 fathoms water; and, from a little distance, the entrance of this large inlet is hardly discernible. A remarkable peak, 3,000 ft. high, having a great precipice on the S.E. side, stands near the S. point of the peninsula which forms the N.W. side of Khor-es-Shem; it is called Jebel Shem. The little village of Shem, with wells of brackish water, is on the N. side of the inlet, 4 m. within the entrance; and abreast it, close to the S. shore of the inlet is **Shem Island**, reducing the width of the channel to $\frac{1}{4}$ m.; the depth being 20 fathoms in this part.

Telegraph Station. To the S. of Shem Island is a small islet on which is situated now the Telegraph Station, whence the wire goes over to Gubet Ghazireh and thence to the Persian coast. (*See Remarks under Gubet Ghazireh.*) At 2 m. above Shem is a narrow projecting point, **Ras Hatam**, about 50 ft. high, and rising gradually to the N.; and, to the E. of this, is the village of **Madeh**, with wells of good water, said to be the best in the inlet.

Seibi is the largest village in the inlet; it contains a deep well of water, which is said to be brackish after a drought, and a water-tank or reservoir, also the ruins of other tanks, and many graves. Near **El Jibbeh Islet** is the entrance to a little land-locked cove, with a depth decreasing from 10 fathoms, which would be a convenient place for laying a vessel aground. On the W. side of its entrance is a small village called **Nathifi**. There is no danger in the Elphinstone Inlet; a sailing-vessel would have great difficulty in getting in or out; but a steamer could with the greatest ease run up the inlet, passing **Shem Island** on the N., and **Seibi** on the S. side, passing all the points as near as convenient. The tides are strong in the entrance at springs.

KHASAB BAY. Khasab Town stands on a sandy beach nearly a mile in extent, in a bay $3\frac{1}{4}$ m. S.S.E. $\frac{1}{4}$ E. from **Ras-as-Sheikh**, and separated from **Kadeh Cove** by a steep ridge of hills. The soundings in Khasab Bay are 8 fathoms in the mouth, and 2 fathoms at $\frac{1}{4}$ m. from the beach, which dries off from the town $\frac{1}{4}$ m. in ridges at L. W., rendering landing at that time unpleasant. The anchorage is sheltered from the prevailing winds, and the holding-ground good, being fine sand; Northerly winds are strong only in winter, and then very rarely and of short duration. In summer a vessel might anchor in 7 fathoms, but in winter not under 10 or 11 fathoms. The soundings in Khasab Bay are 20 to 22 fathoms in a line about E. of **Ras-as-Sheikh**, and decrease regularly; bottom sand and rock. It is a good place for shelter in a Shemal, which here blows W.S.W. to W. by S.; when a vessel might run in and anchor, with **Ras-as-Sheikh N.W.** by W. about $1\frac{1}{4}$ m. in 17 or 18 fathoms, without going quite in to the anchorage off the town.

The Town lies in a date-grove, in which the houses are much scattered, extending a considerable way up this bay. Little is seen from the sea, except a fort near the centre of the grove, and two towers on the beach. The fort contains the sheik's house, and is much out of repair. The sheikh is a wali or deputy of the Sultan of Maskat, who gets an annual revenue of about 400 dollars from the place. Population of the valley about 600 men. Fresh water in good wells plentiful, and used to irrigate the plantations; the best well is close to the hills on the E. side, and about 400 yards from the beach. At the back of the date-grove the valley is well cultivated with corn, vegetables, &c. Supplies of good water, wood, cattle, and vegetables, &c., could be easily obtained; a cloth for wearing apparel, much used by the Arabs, is made here. Quantities of dates are exported from

this place, boats coming from the W. coast of 'Omman, and Kesm, &c., in the date season to procure them.

Kadeh Cove. On the E. side of Ras-as-Sheikh the coast runs S. $3\frac{1}{2}$ m. to the bottom of a narrow cove, where is a small village called Kadeh, with a large date-grove. The cove is $\frac{1}{2}$ m. wide at entrance, and $1\frac{1}{2}$ m. deep; the soundings shoaling gradually from 10 fathoms.

Tides. In the inlet it is H. W. F. and C. at 10 h. 40 m.; springs rise $8\frac{1}{2}$ ft.

Ras Sheikh Mas'ud, in lat. $26^{\circ} 16' N.$, lon. $56^{\circ} 19' E.$, is a high point, projecting on the W. side of Khasab Bay, called **Ras-as-Sheikh** generally, sloping gently up from the cliffs at its N. extreme, which are about 50 ft. high, towards the peak called Fine Peak on the chart, 4,470 ft. high. The long, regular slope of this point cannot be mistaken from the W. A sailing-vessel standing into Khasab Bay, with a W. wind, should not round this cape too close, so as to be becalmed under it. The tides are weak inside this point; but outside set across from it and Perforated Rock, N.E. and S.W., $1\frac{1}{2}$ to 2 knots.

At this point the inlets of the Ruweis-al-Jebal end, the coast to the S.W. of it being comparatively straight. There are 40 fathoms at $\frac{1}{2}$ m. to the W., and 30 fathoms 1 m. to N. of it.

The COAST on the W. side of Ras-es-Sheikh runs S.W. $3\frac{1}{2}$ m., then 11 m. S.S.W. to **Shuam Point**, formed by a mountain about 2,500 ft. high, sloping regularly down to the sea. To the S. of Shuam Point the mountains begin to recede from the sea; the coast trending gradually to S.S.W. and S.W., and being, from this point, a low sandy shore, which continues the whole extent of the S. coast of the Gulf. **Rams**, a fort and small town in a date-grove, stands 6 m. to N.E. from Ras-el-Khaimah; a tower, showing above the trees, is the principal object from sea-ward; it lies on a khor, the entrance to which is nearly dry at L. W. About 2 m. inland, is the hill fort of Zayah, destroyed during the expedition against the pirates.

The soundings to S. of Shuam Point, are 25 to 30 fathoms at 2 m. off. At the commencement of this low coast they begin to decrease, there being 10 fathoms at $\frac{1}{2}$ m., and 20 fathoms 3 m. off, and they still farther decrease on advancing to the S.W.; bottom generally sand.

RAS-EL-KHAIMAH, or JULFAH, in lat. $25^{\circ} 48' N.$, lon. $55^{\circ} 57' E.$, a large town, built on a long sandy peninsula or spit, is the capital of the Joasmi chief, whose authority is acknowledged in all places S. of Ras-es-Sheikh, as far as Jezirat-al-Hamrah, also in Shargeh and the little towns near it, and on that part of the E. coast of 'Ohman called Es-Shemiliyeh. It may contain 4,000 or 5,000 inhabitants. The town is chiefly of stone houses, with some square buildings higher than the rest, which are the sheik's residences; on one corner of the highest is a little dome, which is about 60 ft. above the sea, and visible 12 m. The flag of the Joasmi (red, with narrow white border,) is shown on another high building to the left. In running up from the W., a range of high reddish sand-hills will be a guide for finding the place.

Directions. In crossing the gulf to this place, after taking a departure from the Tumb, the tides, which run strong up and down the coast, may throw a vessel out of her course. There is no danger on the coast, and 20 fathoms will be found about 9 m. off. A good berth is in $5\frac{1}{2}$ fathoms $2\frac{1}{2}$ to 3 m. N.W. of the town; the holding-ground is good, and the natives say there is not so much sea in a N.-Wester as at other places on this coast. Abreast of the town the water is shoal, and this shoal-water is said to extend some distance to the S.W.

The entrance to the khor, or back-water, is round the N. end of the low sandy point on which the town is built, and is $1\frac{1}{2}$ m. to the N.E. of the town; large boats can enter at H. W. unladen: it runs down S.W. close to the back of the town, where the native boats lie; there are only 2 ft. at the entrance at L. W., but 9 ft. when inside, as far as the town. A great many boats and baghalahs belong to this port, which has quite recovered from its destruction by the expedition in 1819. Cases of piracy are now unknown, and the inhabitants of this, once the head of the piratical ports, are quite civil to Europeans. In 1859 Sultan Bin Suggur, the *ci-devant* pirate chief, who was nearly 100 years of age, was still the reigning prince; he succeeded his father in 1803, and signed the treaty against piracy with General Grant Keir in 1820. The inhabitants, who are of the Joasmi or Kawasim tribe, send about twenty boats to the pearl fishery. Supplies of cattle, vegetables, and fruit may be obtained here; water uncertain.

The Coast from Ras-el-Khaimah to Abu Zhabi. This coast, formerly the chief seat of the pirates, is throughout low and sandy, and runs nearly straight, in a general direction S.W. for a distance of 120 m. The mountains of the Ruweis-el Jebal are seen till past Debay, in clear weather. The towns are all built near the entrance of a khor or salt-water creek, of which there are many along this coast, often communicating with each other, or forming large back-waters, in which their vessels are kept. They are very similar in appearance, and it is difficult for the stranger to make out which town he is off. The red sand-hills to S.W. of Ras-el-Khaimah end at 2 or 3 m. to the S.W. of Jezirat-el-Hamrah.

The shore, except just above Uhm-el-Kaiwein, where the reef extends $1\frac{1}{2}$ m. off, is safe as far as Ras Hanyura; and thence to Abu-Zhabi, fronted by reefs; the soundings above the former place are regular. The anchorage off this coast is quite exposed to the prevailing wind, holding-ground often bad, being hard; and no ship should attempt to ride out a winter N.-Wester, but put to sea on the approach of one, standing off on the port tack, as the wind blows about W.N.W. Vessels should anchor further out in winter than in summer, and furl sails with reefs in.

Supplies. Cattle and vegetables, &c., may be everywhere obtained; the beef is often very good, and much better than the mutton. Water is scarce and indifferent, especially to the S. of Debay, and probably could not be spared to a ship. It is generally obtained in shallow wells dug in the sand.

Tides. The tides set straight along shore, N.E. and S.W., and may cause a vessel to find herself off the wrong place, after standing across the gulf. Their rate is from 1 to 2 knots, and the rise and fall varies from 6 to 8 ft. At Ras-el-Khaimah it is H. W. on F. and C., at 11 h. 15 m., and at 1 h. 15 m. at Abu-Zhabi. The stream runs two hours or more after the tide ceases to fall or rise; and navigators must remember this when crossing the Pearl Banks.

The Great Pearl Bank, under which term may be included all the space on the Arab coast S. of the 20-fathom line, begins on this coast; opposite Shargeh may be considered about the commencement. Capital mullet are caught in all the back-waters.

Jesirat-el-Hamrah is a fort and town S.W. by W. 10 m. from Ras-el-Khaimah, built on an island formed by the khor. The fort has five or six towers, and three or four round trees in it, one of which is large and conspicuous, and close to this is a high square tower, with two rows of windows.

Uhm-el-Kaiween, or Amulgawein, in lat. $25^{\circ} 35' N.$, lon. $55^{\circ} 35' E.$, bearing from Ras-el-Khaimah, about S.W. by W., 25 m. is situated on the N. point of the entrance to one of the most extensive back-waters on this part of the coast. Between these places the coast is low and sandy, forming an irregular curve, and fronted by a dangerous coral reef, which projects from it $1\frac{1}{2}$ m. in some places. The outer extreme of this reef bears from Ras el-Hamrah W. by S. $\frac{1}{2}$ S., distant 11 m., and from Amulgawein town N.E., distant $5\frac{1}{2}$ m., having 4 fathoms water close to its edge along the whole extent, 8 fathoms at 1 m. distant, and 12 fathoms about 4 m. from it, sand and rocks. The entrance to the back-water is formed between the point on which the town stands and a low sandy island to the W. of it; and a large bank of sand and rocks lies $\frac{1}{2}$ m. off the point, which contracts the channel to a few yards, where the depth of water near the entrance is only 3 ft. On its banks, about $2\frac{1}{2}$ m. N.E. by E. from the town, there is a large quadrangular tower in ruins, having some straggling date-trees around; which tower is the object first seen in passing from the N. The old town of Amulgawein is deserted, but appears to have been a considerable place; it was destroyed in 1819, by the British expedition against the pirates. The present town, called Libini, is a thriving place, with some 1,500 inhabitants; they possess some large baghalahs, and send seventy or eighty boats to the pearl fishery. There are no fortifications near the town, the sheik's house being the only place capable of offering resistance to an attack.

Anchorage. The soundings off the entrance of the back-water are from 2 fathoms close to the rocky bank, to 6 and 7 fathoms about a mile off shore. The best anchorage is to the S. of the entrance, with the sheik's house, which is the highest building on the island, bearing about E.N.E., in 7 fathoms; the soundings are from 2 fathoms close to the beach, to 6 fathoms $\frac{1}{2}$ m. off, and 7 or 8 fathoms $1\frac{1}{2}$ m. off, sand and rocks. The rise of tide is 6 ft. on the springs. The coast from Amulgawein to Debai being foul and rocky, no ship should anchor near the shore, or she will be liable to lose her anchor. The surveying vessels in a few days lost three, by hooking rocks.

Ajman, or Aymaun, bearing from Amulgawein S.W., distant 12 m., is a small town, situated on the S. point of the entrance to one of the best back-waters on this coast. Between these places there are a few straggling date trees near the sea, and the coast is low, flat, and sandy. At L. W. there are 5 ft. on the bar of the back-water, and within, the soundings are not deep, there being from 6 to 14 ft. in a narrow channel off the N. side of the town. The entrance is about $\frac{1}{2}$ m. wide, and at H. W. the creek forms a kind of basin within the point; but at low tide there is only a narrow channel affording from 6 to 12 ft. water. The town, although small, contains from 1,000 to 1,200 inhabitants, who depend for subsistence upon the pearl fishery, and during the season send nearly one hundred boats to the banks. The returns may be between 12,000 and 15,000 dollars annually.

The anchorage off the town is bad, over a rocky bottom. Near the shore there are 2 fathoms, and 3 fathoms water about a mile off; then the depths increase gradually to 7 fathoms at 3 m. distant; but just without the line of 3 fathoms there lies a small bank with $1\frac{1}{2}$ fathoms on it, bearing N.N.E., distant 1 m. from the town. Keeping in 10 fathoms, about 5 m. off shore, is a safe depth at night.

SHARIKAH, or SHARGEH, (Square Tower) in lat. $25^{\circ} 22' N.$, lon. $55^{\circ} 24' E.$, bears from Aymaun S.W., 5 m. Shargeh, the most important town on the coast, is under the sovereignty of the chief of Ras-el-Khaimah, and contains 8,000 to 10,000 inhabitants, chiefly of the Joasmi or El-Kawasim tribe. It is about $1\frac{1}{2}$ m. in extent along the E. bank of the Khor, and there are several detached towers in it; the highest square one, a little to the right of the centre of the town, is that on which the flag is shown. There is a high round tower at the S. end of the village of Liyeh, which appears part of Shargeh from the sea. At the S. end of the town is some white rocky rising ground, 30 or 40 ft. high, forming a bluff at the S. end, which is conspicuous approaching the place from the N. or N.W. The date-groves extending from Ajman end at Shargeh, but there are a few scattered trees about 1 m. to the S. of it. The coast is said to be called Julfarah by the Persians, but Es-Sirr by the Arabs.

Anchorage. The soundings are nearly regular, 5 fathoms are less than $\frac{1}{2}$ m. off, opposite Liyeh (or Shargeh) Point, and 1 m. off at the entrance to the Khor; 9 fathoms are 3 m. off. The anchorage is with Liyeh Point from S. to S.S.E. (so that boats can fetch off and on from that point with the sea-breeze), in summer in 5 fathoms, but in winter in 6 or 7 fathoms; the holding-ground is bad, being rock with little sand. A heavy swell sets in even with a moderate breeze from N.W., which renders it imprudent to anchor too close in, except in a case of necessity, and the N.-Westers seldom give sufficient warning of their approach. Off this place the 20-fathom line is 25 m. from shore, the great flat called the pearl bank having fairly commenced.

The Khor is very small and shallow, its entrance is a mile N.E. of the flag-staff tower, it runs to the S.W. between the town and the sea, leaving only a narrow strip of sand outside it, winds round the little bluff before-mentioned, and spreads out into a small back-water, joining the Khor from Khan village. Notwithstanding there is only about 1 ft. on the bar at L. W., they manage to get large baghalahs, &c., in, unladen.

The best place for boats to land is not at the creek, where there is generally a surf, but at Liyeh Point, a little projecting rocky point opposite the town, (generally there are some native boats lying there) which you pull round, and should bring to bear about N.N.W.; this is the only place you should attempt to land at in even a moderate N.-Wester. There are plenty of ferry-boats to cross the creek, which on landing here is between you and the town.

DEBAY, or DEBAI, in lat. $25^{\circ} 16' N.$, lon. $55^{\circ} 18' E.$, bearing from Shargeh S.W. $\frac{1}{2}$ S., distant 7 m., stands about 20 ft. above the sea, on the S. side of the entrance to a small creek, having in it from 10 to 27 ft. water near the town, but the entrance has only 2 ft. water at low tide. There are several small banks off it, and the coast is fronted by a long reef to the distance of from $\frac{1}{2}$ to $\frac{3}{4}$ m., which extends N.E. nearly to the distance of Abou Heil. From $1\frac{1}{2}$ fathoms close to the banks, the soundings increase regularly to 6 fathoms at 1 m. off, and at 3 m. off vary from 6 to 8 fathoms over rocks and sand. The rise of tide is 7 ft. on the springs. The town consists of mud hovels, inside a low mud wall, having several breaches, and defended by three round towers and a square castellated building with a tower at one angle, much dilapidated, in which are three or four old rusty guns. The W. tower, situated on a small cliff over the creek, is in moderate repair, with three or four guns mounted. The inhabitants are of the Beni Yas tribe, amounting to between 1,000 and 1,200, and the sheik is subject* to the Imaum of Maskat, who keeps 150 negroes here as soldiers to guard the town. The inhabitants collect shark fins, and send about ninety boats to the pearl fishery, which is their chief support; the yearly returns amounting to between 20,000 and 30,000 dollars. The only fresh-water wells in the place are at the back of the town, in two or three small date-groves; the country otherwise is barren. Dates are procured from Bahrein, and a small quantity of rice from Maskat.

Debai is recognisable as being the last town on the coast, there being not a single date-tree or house from this place to Abu Zhabi. Debai was considered the termination of the Pirate Coast, as the natives to the S.W. have been generally less addicted to predatory habits, and inclined to be friendly to the English, perhaps through fear.

The Coast from Debai to Abu Zhabi stretches in a S.W. direction 67 m., and is safe to approach by the soundings, which are generally regular, over a sandy bottom, mixed with rocks in some places; and the depths are from $4\frac{1}{2}$ to $5\frac{1}{2}$ or 6 fathoms, from 3 to 6 m. off shore. The land in this space is mostly low and flat, without date-trees; but in lat. $25^{\circ} 2' N.$, lon. $55^{\circ} 8' E.$, **Jebel Alli** (220 ft. high) is situated $2\frac{1}{2}$ m. inland. Between this mount and Abu Zhabi are the following places:—**Ras Haswan**, 5 leagues from Jebel Alli; **Ras Guntut**, or **Kanadah**, 35 m. to the S.W. of Debai; **Ghurabi**, about 6 m. from Guntut; **Ras-el-Aura**, in lat. $24^{\circ} 43' N.$, about 7 leagues to

* These, and similar remarks elsewhere, as to the paramount authority over Arab towns, may admit of correction, owing to frequent fights for sovereignty amongst the Ohman Seyyids and their relatives.

the N.E. of Abu Zhabi; Marafjain, 3 m. nearer to the latter; Ras-el-Ghurab, within 10 m. of it; and Ras Luffan, about $3\frac{1}{2}$ m. from Abu Zhabi.

Hadit Thalair Reef fronts the coast from Ras-el-Aura to Abu Zhabi, projecting more than 1 league from the general line of coast; its most prominent part (which has 6 fathoms close-to) bears N.N.E. 17 m. from Abu Zhabi.

ABU ZHABI, or ABOOTHUBBEE, in lat. $21^{\circ} 29' N.$, lon. $54^{\circ} 21\frac{1}{2}' E.$, is a town with a small fort, and about $1\frac{1}{2}$ m. to the S.S.W. of it there is a village and a tower. A ship may anchor at Abothubbee, with the fort from E. to E.S.E., in 3 fathoms about a mile off, or in 4 fathoms about $1\frac{1}{2}$ or $1\frac{1}{4}$ m. off shore; but a shoal projects in a N.W. direction $1\frac{1}{2}$ m. from Abothubbee, and stretches in a N.E. direction about 3 m., at the same distance from the shore, with 6 to 12 ft. on it. Abu Zhabi is the most populous town on the coast. It stands at the W. extremity of the country of Ohman, and is the chief town of the great Beni Yas tribe, and under an independent chief. The first establishment here of the tribe took place one hundred years ago.

The town contains about 20,000 inhabitants, and there are some Banyans here. It sends six hundred boats to the pearl fishery. The Beni Yas tribe is a fine race of men; they wear the hair long over the shoulders, twisted up in plaits. The chief is very friendly to the English. Cattle might be obtained here; but the only water found is exceedingly brackish, all the good water being brought from Debay; and as it is sold at the rate of one keran for two or three goat-skins or mussuks-full, it can only be afforded by the richer class. The Abu Zhabi fishing-boats, out of the pearl season, are found at every island, creek, &c., between this place and Khor el 'Adeid; the chief of Abu Zhabi claiming the sovereignty over the intermediate coast. His authority is nominally recognised also by the Beduin on this part of the coast.

Pilots. A ship intending to visit the coast and islands between Debay and El Bidah, would get the best pilots at this place.

Directions. A vessel bound to Abu Zhabi, had better take a departure from the island Sir Abu Nufair, and keep the peak of that island N. $\frac{1}{4}$ W. while in sight: great overfalls will be met with in the soundings; and she must be prepared for finding herself set to either side of the place by the tide. A good look-out must be kept from the mast-head, as the fort, the first thing seen, will not be visible more than 8 m. from the deck, or when in 8 fathoms; which depth is also found close to the reefs. The reefs to the E. of the place are the chief danger. If coming down the coast, care is requisite, particularly at night, in passing the Hadit Thalair Reef.

THE COAST, to the S. and W. of Abu Zhabi, changes to a W. direction, and is fronted by a chain of islands, formerly called **East-India Company's Islands**, but each of them has a native name. This chain extends parallel with the coast in an E. and W. direction, from the meridian of Abu Zhabi to Khor-el-Besm, and is surrounded by an unbroken line of coral reefs, and shoal water extends many miles off them. Therefore no ships should go below the latitude of Abu Zhabi, or bring Dzarkuh Island to bear to the N. of N.W. by W. The other islands, to the W., are also surrounded by reefs, but they are less united, having channels between them.

Khor-el-Besm is a spacious inlet or channel, with soundings of 3 to 7 or 8 fathoms; the only safe entrance into it is lon. $52^{\circ} 58' E.$, 6 m. to the W. of Besm-el-Gharbi, between the shoals off that island and Aish Islet. Merchant ships, however, can have no object in coming here, for the coast has no villages, being only a stony desert shore. **Khalat Hail** is a sandy islet near the verge of the shoal water, which lies 15 m. to the N.E. of Khor-el-Besm. **Khalat Huwaila** is a similar but smaller sandy islet, lying 4 m. to N.W. of the other, with a passage called Khor Bishubur between.

Rak-el-Hiyi, an extensive shoal, lying 50 m. to the W. of Abu Zhabi, has its N. extreme in lat $24^{\circ} 35' N.$, and lon. $53^{\circ} 29' E.$ The islet Khalat Huwaila stands on the S. verge of this shoal. The sea is clear between Rak-el-Hiyi and Dzarkuh Island, but to the S. of the latter lies the Stannus Shoal.

Fasht Butini, or Stannus Shoal, has many dry banks on it, and extends from lat. $24^{\circ} 31' N.$, to lat. $24^{\circ} 40' N.$, and from lon. $53^{\circ} E.$, to lon. $53^{\circ} 9' E.$; the N. end being 4 leagues due S. from Dzarkuh Island; between them the soundings are from 5 to 8 fathoms, with a small shoal-bank of $2\frac{1}{2}$ fathoms $1\frac{1}{2}$ m. S. of Dzarkuh. To the S.W. of Stannus Shoal, the depths are from 7 to 10 fathoms towards the entrance into Khor-el-Besm, or to the distance of 3 leagues in the direction of Seir Benu Yas; but from the latter island in a N.E. and E. direction, to the distance of 4 leagues, there are many shoal spots and several dry sand-banks.

SEIR BENU YAS, situated 6 leagues to the S.E. by E. of Dalmah, has two peaked hills in the centre of the island, 480 ft. high, in lat. $24^{\circ} 19' N.$, lon. $52^{\circ} 37' E.$ It is about 6 m. in extent, N. and S., and 3 to 4 m. in breadth, its N.W. extremity terminating in a low sandy point. It is bounded on its N. and E. side by a shoal-bank extending 1 or 2 m. from the shore. The

S. point of the island is distant about 3 m. from the main land, leaving a narrow shoal channel, navigable only by small pearl-boats. The S.E. point of the island curves round to the W., forming a safe land-locked harbour within it, for small vessels, with 5 and 6 fathoms water, and from 3 to 4 fathoms at the entrance. The channel between Arzanah and Seir Benu Yas is safe, with irregular depths from 8 to 19 fathoms. From hence, the whole coast to the W. is very low, and several small islands lie off it, considered dangerous to approach.

Jebel Duwarikah, in lat. $24^{\circ} 10' N.$, lon. $52^{\circ} 37\frac{1}{2}' E.$, is a point of land 350 ft. high, at 3 m. S. from Seir Benu Yas: and from hence to **Ras-el-Mashereeb**, in lat. $24^{\circ} 18' N.$, lon. $51^{\circ} 45' E.$, the coast, which is generally low, forms a bight, receding to lat. $23^{\circ} 58' N.$, and is fronted by a shoal-bank of foul ground, projecting 6 m. in some places, and at other parts only 2 to 4 m. About 10 m. from the coast, and $4\frac{1}{2}$ leagues W. by S. from the S. point of Seir Benu Yas, lies a 2-fathom bank, having 7 and 8 fathoms water around; from this, **Jebel Duwarika** bears E. by S. distant 13 m., and other shoals lie between.

Psyche Islands, between the lat. of $24^{\circ} 9'$ and $24^{\circ} 15' N.$, and in lon. $52^{\circ} E.$, are two low islands, with some small islets and shoals to the W. and S.W. of them, and 5 m. of reefs to the N.E., N., and N.W.; these islands are 7 leagues to the S.W. of Dalmah Island, and the depths are from 9 to 20 fathoms in the direct line between them. The N. island, which is the largest, is called **Yahs**, and (the plural of this) **Yasaht** is the Arab name for the group.

THE COAST. At 10 m. to the W.N.W. of Ras-el-Mashereeb lies a head-land, named **Ras-el-Adrah**, or **Khadrah**, in lat. $24^{\circ} 23' N.$, and between these capes are two deep inlets, formed by the contiguous shoals and islands; and 2 m. to the N.W. of Ras-el-Adrah is **Rarah**, or St. Thomas Group, consisting of several small islands and rocks. Goodwin Islands, or **Kaffay**, lie $4\frac{1}{2}$ leagues to the N.E., in lat. $24^{\circ} 35\frac{1}{2}' N.$, lon. $51^{\circ} 44' E.$, from whence S. to Ras-el-Mashereeb, and towards Psyche Islands, a continued chain of reefs and shoal-banks extend, requiring great caution in any vessel which might approach the great bight to the W. of Dalmah. From Ras-el-Adrah the coast extends about $4\frac{1}{2}$ leagues to the W.S.W., then takes a N. and N.N.E. direction, by which a great bay, called **Khor-az-Zuan**, is formed, having several shoal-banks in it, with soundings of 3 to 9 fathoms between them generally throughout the bay.

Ras Boogmais, in lat. $24^{\circ} 34\frac{1}{2}' N.$, lon. $51^{\circ} 30\frac{1}{2}' E.$, is $3\frac{1}{2}$ leagues to the W. of Kaffay, and forms the N. boundary of Khor-az-Zuan. A shoal extends 4 m. from it to the E., and about 4 m. to the N.W. of it, round a mount, called **Jebel Udaid**, is the entrance to a deep inlet or back-water, called **Khor-el-Udaid**. **Jezirat-ain-Lasaht**, in lat. $24^{\circ} 46' N.$, lon. $51^{\circ} 37' E.$, distant 2 leagues from the main, is a group of three small isles, with some rocks and shoals near them to the N., and a great shoal, named **Fasht-el-Udaid**, to the N.E., which is dry in patches, and extends from lat. $24^{\circ} 44'$ to $24^{\circ} 54' N.$, its E. edge being in lon. $51^{\circ} 53' E.$ To the E.S.E. of this shoal, and N.E. from Kaffay 6 leagues, lies a small sandy isle, called **Halat Dalmah**, with an extensive shoal of 6 m. in extent to the S.W. and N.W.; and **Machassib**, another small isle, is situated nearly mid-way between this shoal and Goodwin Islands, also surrounded by a shoal, with a most extensive shoal to the S.E., in which direction for many miles no soundings have been taken. Therefore, when in this part, a vessel should not lose sight of Dalmah high island.

Rai-el-Allarch, in lat. $24^{\circ} 59' N.$, lon. $51^{\circ} 37' E.$, has a reef projecting 7 m. to the S.E., called **Fasht Areif**, and there is a passage of 3 m. wide between it and **Fasht-el-Udaid**, with depths of 6 to 14 fathoms. Between the tongue of **Fasht-el-Areif** and the sandy coast to the W. is a bight, affording secure anchorage in N.W. winds, with depths from 9 to 3 fathoms. About 11 m. to the E. of Ras-el-Allarch is the S. extremity of a large bank, called **Rak Greynayn**, having many shoal patches on it, extending from lat. $25^{\circ} N.$ to $25^{\circ} 14' N.$ and from $3\frac{1}{2}$ to 5 leagues E. and W. **Ras Abu-l-Mashut**, in lat. $25^{\circ} 16' N.$, and 17 m. to N. of Ras-el-Allarch, is a projecting head-land, having a bay to the N.W. of it, surrounded by shoals, with the town of **El-Bidah** at the bottom of the bay, about 4 m. to the W. of the head-land; and the low islands **Jezirat-es-Sufy**, and **Jezirat-el-Ali**, the first 4 m., and the other about 7 m. to the N.N.W. of **Mashut**.

THE COAST from Wakra to Ras Rakkin is all low, except at **El-Bidah**, where there is some slightly elevated rocky ground, and a few hillocks in different other parts; it is chiefly stony desert, the N. part being very low. The chain of out-lying reefs extending all the way from **Yasaht** Islands, ends at **El-Bidah**, and the sea above that place is clear of danger; but the shore-reefs extend, in places, as much as 9 or 10 m. off shore, so that the bottom is seen under the vessel before the land is made. The coast north of **El-Adeid** is called **Burr Kutr**, or **Gatr**, which name applies to the whole of the peninsula. It is under the authority of the Sheikh of Bahrein. The towns of **Kutr** send two hundred boats to the pearl-fishery, chiefly from **El-Bidah** and **Wakra**. It is inhabited by, perhaps, nine or ten different tribes of Beduin, of whom the **Monasir** bear a bad character.

The Tides set N. and S. along the coast between Rak Greynain and Wakra, but not very strong; the flood sets to the S.

Wakra, a town lately rebuilt, and a very rising place, is close to the beach, and has twelve towers; with about 1,000 inhabitants, and many boats belong to it. One mile to the S., close to the shore, stands a little hill called Jebel Wakra (85 ft); it is a level-topped rocky hill, of brown colour, visible 12 m. The town may be approached to about 2 m. Native boats run close up to the town at H. W., either through or over the reef. A ship would have to anchor 2 to 2½ m. off shore, in 4 fathoms.

BIDAA, or EL-BIDAH, and DOHEH, are two large towns close together, situated in a deep bay, the reefs off which make it a natural harbour. The land on the W. side of the bay is 40 to 50 ft. high, and a stony desert, quite level on the top; Ras-bel-Mashut, the S.E. point of the bay, is quite low, and the entrance to the harbour is about 2 m. to the N. of it. The promontory between Bidaa and Bahrein, terminating in Ras Rakkin, is all styled El-Bahrein.

The Sheikh of El-Bidah, who is under Bahrein, has some authority over the chiefs of the other two towns. The three towns together may contain 5,000 inhabitants, of the Uttubi tribe. They are constantly at feud with the Beduin, and not safe to be outside the walls after dark. They are also often molested by the Wahebbi chief, whose capital, Riyadh, is seven days' journey inland. *Water* is dear here and indifferent; the best is brought in skins from the desert, some distance from the town. There are few supplies. Fire-wood is brought from the interior, and also from Clarence Strait, (El-Kishm Island). They have no large baghalahs, but many pearl boats, and the inhabitants are all employed in the pearl fishery.

Making the place. A vessel coming from the N. could not sight the Kutr coast S. of Ras Laffan; she should stand down the coast in a line of between 5 and 7 fathoms till El-Bidah bears by account W.S.W., when she should haul in for it, keeping a good look-out, till in 3 or 4 fathoms, outside which depth the town will not be seen. If coming from the N.E. or S.E., she had better take a departure from Halul Island, which is visible 14 m., and should bear while in sight E.N.E. If she should have been set by the tide to either side of the place, she would make either Jezirat 'Ali, or Jebel Wakra instead; in the latter case, she is too near Rak Greynain Shoal. There is an extensive flat outside the entrance to the harbour extending 4 m. beyond the reefs; it has 8 fathoms close-to, and there are 3 and 2½ fathoms all over it; bottom white sand. This is the principal difficulty for a ship to get over; if drawing more than 12 ft., she should anchor on the edge, and wait for H. W. The H. W. at F. and C. is about 7½ h., rise and fall 6 ft. **Entering the harbour** will be easier done in the forenoon; it is very difficult to see the reefs when entering the harbour in the afternoon, or leaving it in the forenoon. After sighting the high tower, on the high land behind the town, it should be brought to bear W.S.W., which is the fair way in, but a pilot is necessary.

RAS LUFFAN, in lat. 25° 54½' N., lon. 51° 33' E., bears nearly N. from Ras Abu-l-Mashut, the coast between them being mostly low or swampy, with some small indentations and shoal-banks, projecting 3½ leagues from it in some places: but at Ras Luffan, and 10 m. to S., the shoal-bank projects only from 2 to 3 m. off the land, and the soundings decrease gradually in approaching this part of the coast. From Ras Luffan, the coast takes a N.W. direction for about 8 leagues to Ras Rakkin, having in this space some small bays, with the town of El-Huwaitah 2 leagues W.N.W. from Ras Luffan, and Fuairat town about 4 leagues distant from the same head-land. The shoal-bank that lines the coast between these head-lands extends generally about 1½ m. or 2 m. from the shore, with regular soundings in its proximity.

Ras Reccan, or Rakkin, in lat. 26° 11' N., lon. 51° 14' E., is the N.W. point of a small low island contiguous to the main land, which has a reef stretching out from it 2 m. to the N. and N.W. No kind of vegetation is to be seen on this coast. A vessel should not approach within 3 m. or 6 fathoms.

THE PEARL BANKS AND OUTER ISLANDS.

The **Great Pearl Bank**, under which term may be included all the space on the Arab coast to the S of the 20-fathoms line of soundings, commences on the E. about Shargh, passes about 3 leagues to N. of Sir Abu Nufair, and to Halool Island; thence to N.W., passing about 10 leagues to N.E. of Ras Rakkin, then about W.N.W. for 40 leagues to Jezirat Bu Ali, in lon. 49° 40' E. This includes the pearl-banks of El-Bahrein also. Great reefs extend for miles out of sight of land, sometimes with channels between them. This part of the gulf is shoal everywhere, with great overfalls, forming the largest and richest portion of the Pearl-Bank. The water is everywhere

quite clear. The pearl banks are shoal knolls with 3 to 9 fathoms, and probably each one has a name by which it is known to the Arabs.

The many islands, some of considerable height, that stud the Pearl-Banks, are excellent landmarks, rendering the navigation less difficult. They are all barren and without water; and, with the exception of Dalmah, have no permanent inhabitants. They are frequented by the pearl boats during summer; and in winter by Abu Zhabi fishermen, who catch and dry fish, and take turtle, which abound on the reefs.

A vessel intending to visit the coast of the gulf to S. of the Pearl-Banks, or to navigate within the reefs, must have an Abu Zhabi pilot on board.

SIR ABU NUFAIR, or SEIR ABONEID, N. point, in lat. $25^{\circ} 15' N.$, lon. $54^{\circ} 14' E.$, is 2 m. in length N. and S., and 2 m. broad, having a peaked hill 240 ft. high at its S.W. part, with soundings of 3 or 4 fathoms very near the shore, and 14 or 15 fathoms about a mile from it all around. In a direct line from this island to Zircooa the soundings are generally from 18 to 19 fathoms. This island contains large quantities of sulphur, and has some mineral springs. It lies 35 m. off the Arab coast.

Dak Zakoom, or Rak Zukum, is a large pearl-bank, the shoalest part of which ($3\frac{1}{2}$ fathoms,) is 35 m. to S.W. of Seir Aboneid, and 38 m. to N.W. by W. $\frac{1}{4}$ W. from Abu Zhabi.

DZARKUH, or ZIRCOOA, the S. end, in lat. $24^{\circ} 52' N.$, lon. $53^{\circ} 6' E.$ extends $2\frac{1}{2}$ m. to the N.N.W., and is the highest island on this side of the gulf, 540 ft. high. It is about 2 m. in breadth E. and W., distant 14 leagues from the nearest coast. There are 10 fathoms water about a mile from the N. end of the island, and 5 or $5\frac{1}{2}$ fathoms 1 m. off its S. point, but a $2\frac{1}{2}$ -fathom bank lies about 2 m. S. from the S. point, and a spot of 18 ft., 1 m. from the N.W. part of the island. The sea is clear of shoals between Dzarkuh and Abu Zhabi, and the fair channel between Ras Zakoom and Rak-el-Hiyi is 15 m. wide.

Karnein, or Girnein, in lat. $24^{\circ} 56' N.$, lon. $52^{\circ} 53' E.$ (S. point,) lying about 4 leagues to the S. of Das, is about $1\frac{1}{2}$ m. in length N.W. and S.E., with three high hummocks nearly of equal height, 190 ft. high, two on the N. extremity, and one a little to the S. Shoal water and foul ground front its S. end and E. side, from $\frac{1}{2}$ to $\frac{3}{4}$ m., so that it affords no shelter in a Shemal; but the N. and N.W. parts are more bold to approach.

Das, or Dauss (the peak,) in lat. $25^{\circ} 9\frac{1}{2}' N.$, lon. $52^{\circ} 53' E.$, is about $1\frac{1}{2}$ m. in length N. and S., high at the N. end 145 ft., but low at the S. It appears to be volcanic, and is destitute of trees, the S.W. extremity terminating in a low sandy point. There are 6 and 7 fathoms water within $\frac{1}{2}$ m. of the island; and, within 3 m. to S. and S.E. of the islet, shoal spots of 12 to 24 ft.

Arzanah, or Arzeneh, in lat. $24^{\circ} 47' N.$, lon. $52^{\circ} 34' E.$, 9 leagues to the S.W. of Dauss, is 200 ft. high, rugged in appearance, 2 m. in extent N. and S., and $1\frac{1}{2}$ m. in breadth. The N.W. and W. parts have 9, 8, and 7 fathoms nearly close to the shore, but a 1-fathom shoal lies 2 and 3 m. from the E. side: and an extensive 3-fathom bank lies from 2 to 5 m. to the N.E. There is a 3-fathoms shoal, a pearl-bank, with the centre of the island bearing S. by E. distant 8 m.; and several others off its N. and E. sides. No fresh water was discovered; but from the ravines occasioned by heavy rains, some might probably be got by digging wells. It produces only a few herbs, but no trees, and the S. extremity of the island terminates in a low sandy point.

Dalmah, or Dalmy, the S. end, in lat. $24^{\circ} 27\frac{1}{2}' N.$, lon. $52^{\circ} 19\frac{1}{2}' E.$, lying 20 m. to the S.W. of Arzanah, is 244 ft. high, of darker colour than the former island, and about 5 m. long from N. to S., and $2\frac{1}{2}$ m. broad. On its N. part is a round hill, below which the boundary is bluff, but not high; and, excepting at the S. point, the island may be approached to 7 fathoms. To the S.E. it is nearly of equal height, with two or three hummocks above a very low, narrow, sandy point, which extends from N. to S., terminating the S. extremity; beyond which a shoal spit of 1 fathom extends to a dry sand-bank, Kalat Masuma, at 3 m. distance. There is no safe passage for large vessels to the S. of this island, on account of sudden overfalls. The sea between it and the Goodwin Islands (Kaffay and Mayamat-et-tein,) has not been sounded, but extensive shoals lie more than 12 m. to E. of the latter. The channel between Dalmah and Arzanah is clear of shoals, but the overfalls are sudden, from 8 to 20 fathoms, fine coral sand.

Deyni, or Dainy, in lat. $24^{\circ} 58\frac{1}{2}' N.$, lon. $52^{\circ} 24\frac{1}{2}' E.$, bearing N.W. 13 m. from Arzanah, is about $1\frac{1}{2}$ m. in length, narrow, and only 8 ft. high. The colour of the sand in hazy weather renders it difficult to be distinguished when at a distance, and great caution is necessary in approaching this island, which has a shoal-bank surrounding it and projecting above $\frac{1}{2}$ m. from the N. part, with two small islets near the N.W. point. A 3-fathom pearl-bank lies 7 m. to the E. by S. $\frac{1}{4}$ S. The depths decrease regularly towards the bank all round.

Shirah-ao, or Sherarow, S. point in lat. $25^{\circ} 2' N.$, lon. $52^{\circ} 14' E.$, to the N.W. by W. of Deyni, is rather low and narrow, extending only a mile W. and E., with two small hummocks on

each extremity 40 ft. high; and at 1 m. off the N. point lies a small pyramidal rock above water, towards which and the island the depths regularly decrease, and there is a safe passage between the rock and the N. end of the island. To the W. of this island, the coast ought to be approached with care, as it is very low, and a most extensive shoal-bank, called Rak Greynain, lies mid-way, leaving the only safe channel near the coast, or from 3 m. to 7 m. off Jebel Wakra. About 5 m. N.W. from the pyramidal rock is a shoal of 6 ft. on a bank of 4 fathoms. The channel between Deyni and Sherarow is considered safe, although H.M.'s sloop *Favourite* is said to have had $3\frac{1}{2}$ fathoms the least water, on some overfalls, of sand mixed with white coral.

Halul, or Hawlool, S. point, in lat. $25^{\circ} 40'$ N., lon. $52^{\circ} 25\frac{1}{2}'$ E., situated to the N.N.E. of Sherarow, 40 m. to the N.W. of Das, and 50 m. to E.S.E. of Ras Luffan, is about a mile in length, of round form, and 180 ft. high, decreasing gradually at each extremity. It is destitute of trees, without any appearance of vegetation, and the soundings decrease gradually all round it, to 2 or 3 fathoms nearly close to the shore; but a rock above water lies at a small distance off the N. point of the island. **The Shah Allum Shoal** lies 45 m. to N. $\frac{1}{2}$ E. from Halul Island.

The above islands appear to be of the same formation as Polior and the other islands on the Persian side of the gulf, being of a brownish colour, with a coral base: they are situated nearly in the centre of an extensive pearl fishery, which affords perhaps the best pearls in the world: and the season for this fishery is from April to September. A full description of all islands and banks between the above and the coast cannot be given. The chart must be the guide, and every vessel must take a pilot. **Rennie rocky shoal** (only 16 ft.) lies 46 m. to N. of Bahrein.

COAST FROM RAS RAKKIN TO EL-KOWAIT.

Ras Rakkin, or Reccan, in lat. $26^{\circ} 11'$ N., lon. $51^{\circ} 13\frac{1}{2}'$ E., is the extreme point of that remarkable tongue of land which, projecting to the N., forms on its W. side the Gulf of Bahrein. The cape itself is the N. point of an irregularly-shaped island near the coast to the W. of Ras Anfeer, the N. main-land point. A coral reef surrounds Reccan Island, and lines the contiguous coast to the distance of $3\frac{1}{2}$ m. from the shore. This reef extends, with little interruption, from Ras Allarch along the shore already described, to Ras Reccan, and from thence to the S.W. 5 leagues, as far as Ras Asheraj. **Khor Hasan** is a town distant 3 leagues S.W. from Ras Reccan. Vessels may anchor here in from 4 to 6 fathoms water, off shore 5 m., sheltered from all winds but those that blow from the N. Khor Hasan was the seat of the pirate chief, Ramah-bin-Jahber, who blew up his vessel in action, in 1826. There are several small villages along this part of the coast: Zabara, in lat. $26^{\circ} 0'$ N., has extensive ruins close to the new town, which has some 1,500 inhabitants. About 2 m. W. of the latter place there is a sharp point of land, called **Ras Asheraj**, forming a small bay on its E. side, near the head of which is the village of Robejjeh, on the coast about 2 m. S. from Ras Asheraj. The *Vestal*, at anchor in $5\frac{1}{2}$ fathoms, soft ground, off Khor Hasan, had Jebel Dukhan on Bahrein Island in sight from the mast-head, bearing about W. by S., distant about $7\frac{1}{2}$ leagues.

The shoal sand-banks fronting Khor Hasan, with from 1 to 3 fathoms water, stretch across to the body of Bahrein Island. **Faah-ad-Dibal Shoal**, dry in several places, lies 5 leagues to the W. of Ras Reccan, and about the same distance E. from Maharak Island, its N. end being in lat. $26^{\circ} 17\frac{1}{2}'$ N. Another rocky shoal, called Gatat Yaradeh, in lat. from $26^{\circ} 7'$ N., to lon. $26^{\circ} 11\frac{1}{2}'$ N., is 6 m. to the S.S.W. of the former (and nearly joined,) with 9 to 12 ft. thereon; and the soundings from these shoals W. to the reef around Maharak Island are from 4 to 7 fathoms. **Scorpion Shoal** is said to lie to the N. of Ras Reccan, and the water deepens from 6 or 7 fathoms near that cape, to 17 and 18 fathoms near the shoal; but the depth on it is not known, nor does Captain Constable's chart show it; he seems to ignore its existence.

The coast to the W. of Ras Reccan trends S.W. 4 or 5 leagues, and then about S.S.W. to the head of the Gulf of Bahrein, in lat. $25^{\circ} 9'$ N., when it suddenly changes to N.N.W., forming the W. shore of the gulf. Seven leagues to the S. of Ras Asheraj is the entrance of a deep inlet called Duhet-el-Ufzan. Off the point which forms its W. side are the Warden Islands, the largest of which, Jezirat-el-Hawar, lies parallel with the general direction of the coast, and is about 11 m. long. The coast S. of the Warden Islands continues in a S. by W. direction for about 9 leagues to the head of the gulf, which forms a tongue-shaped bay, called **Duhet Selwah**. The coast forming the W. side of the Gulf of Bahrein runs from the head of the gulf in a N.N.W. direction for about 5 leagues, and then N.W. by N. for 3 or 4 leagues, at which point a wide but slightly-indented bay commences, having the island of Zuknooniyeh or Zuenone in its S. part, and the port of Ahjeyr in its N. part.

Ahjeyr, or Ukair, formerly called Jilla-Ogeia or Ayndra, on the W. shore of the Gulf of

Bahrein, is in lat. $25^{\circ} 40' N.$, and is the port of the late Wahabee capital of Deriah; but the land is sterile and thinly inhabited along this part of the coast. From Ahjejr the coast resumes a N.W. by N. direction to the parallel of $26^{\circ} N.$, where there is an islet called Duhet-ed-Dahan; to the N. of this inlet the coast takes a N.N.E. direction, to **Kalaht-el-Husein Point, or Ras Chawachab**, and curving gradually again runs to the N.W. to the town of El-Katif, in lat. $26^{\circ} 33' N.$

BAHREIN ISLAND extends from lat. $26^{\circ} 14\frac{1}{2}'$ to $25^{\circ} 46\frac{1}{2}' N.$, and occupies a central position in the Gulf of Bahrein. It is about 80 m. in circumference, it seems very fertile, and about one-fifth of its surface is cultivated, covered with plantations of date-trees, &c.; its N. shore extends nearly in an E. and W. direction. The chief town, Manamah, on the N.E. extremity, is large and populous; the buildings are, comparatively, well constructed, and the place altogether appears more respectable than any other town in the Persian Gulf. The bazaar is well supplied with fine cattle, poultry, fish, vegetables, fruit, also with grain; and a very considerable trade appears to be carried on with this port, particularly by those tribes who inhabit the whole extent of the Arabian coast from Ras-el-Khaimah to Koweit. Although plenty of cattle and fine large sheep were for sale, yet the prices demanded for them were higher than at any other port in the gulf; and rice, being imported, was consequently both scarce and dear. The population is supposed to amount to 40,000, or upwards, who employ more than 140 vessels of different sizes in trading to various places, which produces a considerable revenue; but the pearl-fishery is of the greatest importance to the island, which in the season employs 400 boats, each containing from eight to twenty men, affording an annual product, it is said, of between sixteen and twenty lacs of dollars. The town of Ruffah, situated on a hill 7 m. inland, is the next in consequence to Manamah; but, like most Arab towns, consists of a ghurrie or fort, surrounded by inconsiderable houses, built on the ruins of a former town. There are numerous springs of excellent water in the interior of Bahrein, but at too great a distance from Manamah for a ship to be readily supplied.

Manamah, a large town on the N.E. point of the island, with perhaps 8,000 inhabitants, is built along the shore for about $\frac{3}{4}$ m. The houses are mostly poor; the only conspicuous one being the sheik's, which is a high semi-fortified building near the W. end of the town, on which the flag is shown: close to the E. of it is a small minaret, only seen when in the inner anchorage. The N.E. point of the town is called Ras Ruman: $\frac{1}{4}$ m. S. of this is a clump of dates behind the town standing on a little rising ground.

The landing at the town, though better than at any other part of the island, is inconvenient, except at H. W.; the shore-reef being very shelving, boats cannot come within $\frac{1}{4}$ m. of the beach at L. W. Donkeys are always brought down, to assist persons landing, and to unload goods, &c. The following supplies are procurable:—*Water*, in plenty, and of good quality; if you have no water-casks, see that the large wooden tank it is brought off in is clean; bullocks, sheep, and poultry, vegetables and fruit, Arab bread, flour, rice, &c., and other articles for use on board ship, except biscuits, spirits, and salt meat; fire-wood, but not for steam purposes; teak timber for repairs, but very dear; no iron-work. A baghalah's mast might be got, as a substitute for a broken spar, of heavy wood (poon.)

The chief is very friendly to the English government, who support him against the aggressions of the Wahebbi Amir. There is a British agent, who is an Arab; and many Banyans are settled here. The inhabitants of this town, of Maharak and Al-Hed, are chiefly employed in the pearl fishery, to which altogether 400 boats are sent from these islands; but there is a large agricultural population. Owing to the numerous springs of water on the N. part of the island, which are carefully employed in irrigation, it is very fertile; and the verdure, so unusual in this country, has a very pleasing effect. There are great numbers of fruit-trees, as citrons, limes, &c.; and very fine date plantations; much lucerne is grown for forage. The island produces quantities of dates, which are exported to other parts of Arabia, and India. The other exports are:—pearls, a few of the finest horses in the world, and some remarkably fine asses, to India and Maskat. Cotton sail-cloth for baghalahs is made here of very good quality, and exported to Koweit, Basrah, and to India. The only other manufactures are:—coarse cloth for turbans, &c., and mats made of the date leaf, of fine texture.

Some trade is carried on with India, many fine baghalahs belonging to the port. They have 200 vessels from 20 to 300 tons, besides the smaller ones. The sheik has some fine war vessels, chiefly Batils, which are very fast sailers; his large baghalah, the *Duniyah*, which is now employed in trade, mounted 10 guns. The imports are: Rice, timber, and other materials for ship-building, and piece goods, &c., from India; and coffee from the Red Sea. Near the ruined mosque with the two minarets, are the ruins of a considerable town, much better built than the present one, called Beled-al-Jedim (the old town); there are also some well-built baths over some of the springs. It, therefore, appears to have fallen off in prosperity since earlier times. There are still many villages

on the island in different parts; but, according to all accounts, few compared with the number formerly existing. The largest spring on the island issues from a reservoir about 30 ft. deep, and 30 yards across, in a stream 6 or 8 ft. wide, and 2 ft. deep, which will give an idea of the supply of water on the island: it is about 1 m. S.W. of the minarets. Near the mosque, a fair is held every Friday, for the sale of horses, cattle, fruit, &c., which is frequented by a large number of people. **Portuguese Fort**, or Jiblah, is on the N. face of Bahrein Island, 3 m. to the W. of the sheik's house in Manamah. It stands in a gap of the date-trees, and is useful as a mark to vessels entering. The minarets stand 2 m. to S.W. of Manamah, and **Jebel Dukhan** (400 ft.) is 10 m. to the S. of them.

Approaching Bahrein from the N. Departing from Berdistan Bank with the Hammocks of Kenn N.E. and Barn Hill E., steer S. by W. with flood-tide, or S.S.W. with the ebb, which is thought to be the best course. The soundings in mid-gulf are 40 fathoms, or a little more; and, by the deep-sea lead, you can tell which way the vessel drifts. Having approached the parallel of 27° N., keep a trusty person at the mast-head to look out for shoals or discoloured water, which from aloft can generally be seen at a considerable distance: here, also, the lead must be kept briskly going, for you will get upon the **Pearl or Bahrein Bank**, in about lat. $26^{\circ} 50'$ N., suddenly shoaling from 30 and 25, to 14, 10, or probably to 8 fathoms water, on a sandy bottom. Keep well to the E. of the meridian of Maharak Island, for the **Bennie Rocky Shoal**, with only 16 ft., lies 46 m. to the N. of Bahrein Harbour, and shoal spots of 3 to 6 fathoms have been found on the Ishairah Pearl Bank, in lon. $50^{\circ} 37'$ E.; whilst a 5-fathoms bank lies at 17 m. to S.E. of Ishairah.

With a favourable wind, or in the night, keep under reduced sail to obtain true soundings, and be ready to anchor instantly, if you get less water than was expected. The soundings, however, as you proceed to the S., will be from 9 to 8 fathoms, with overfalls occasionally from $9\frac{1}{2}$ to 7 fathoms. Attention to the tides is necessary, which run strong on the springs, particularly as you approach the islands; they set about E. and W. With an adverse wind, work between the meridians of $50^{\circ} 50'$ and 51° E., which space may be considered the **Fairway** into Bahrein. There are no dangers for a small vessel to the E. of the meridian of Rennie Shoal, although a space of 30 or 40 m., E. and W., on the edge of the Pearl-Banks, to the E. of lon. 51° E., has overfalls in the soundings of from 9 to 20 fathoms; and this part is called by the Arabs Abu Kharab. In lat. $26^{\circ} 55'$ N., lon. $51^{\circ} 1'$ E., the *Favourite* sloop of war had 6 fathoms rocky bottom, which was thought to be on the Bu-Athama Bank. The *Durable* was lost in August, 1817, on the Fasht-Bu-Safeh, more than 30 m. to the W. of this, on her voyage from Bushire to Bahrein. Had she taken a departure from Berdistan Bank, she might have passed to the E. of all these dangers. In this Fair Channel there appears to be no danger until you approach the islands; and when in lat. $26^{\circ} 30'$ N. or $26^{\circ} 28'$ N., you will see from the deck the trees on the N. point of Maharak Island, bearing to the S.W., distant 3 or 4 leagues, in soundings from 8 to $5\frac{1}{2}$ fathoms.

Maharak Island is very low, and of horse-shoe shape, convex to the N.; it is surrounded by the **Jaliyeh Shoals** and other reefs, which project from it 3 m. in some places, particularly in a N.W. direction, where the flat rocky spit projects nearly $3\frac{1}{2}$ m., and is called Ras Khaseifeh. If this point bear S.E. by S., and Portuguese Fort S.W. $\frac{1}{2}$ S., you will be in $2\frac{1}{2}$ fathoms on the W. edge of Arad Reef, with the rocks visible under the vessel. To avoid these reefs in proceeding to the Bahrein Harbour, haul to the W. towards the Teigmouth Shoal, till Portuguese Fort, which is 80 ft. high, bears S.S.W. $\frac{1}{2}$ W. or S.S.W., which seems to be a good leading mark to avoid the dangers on either side; and on that line you may anchor in the **Outer Harbour** in $4\frac{1}{2}$ or 5 fathoms, when Maharak Fort (at the S. end of the town,) bears about E.S.E.

Maharak Town is about as large as Manamah, to the N.E. of which it lies, about 2 m. distant; the passage between them admitting native vessels to pass from the N.W. to the S.E. harbour; and a communication is constantly kept up between the two places by means of ferry-boats. This passage is occasionally used in fine weather, by the country boats drawing 6 and 8 ft. water; but the tide is so rapid in this intricate channel formed between the reefs, as to render it hazardous even for a small vessel. The only water used on Maharak, as well as that for supplying vessels, is brought up in skins by the divers from the bottom of the sea, at the depth of 6 ft. at L.W., about 3 cables to S.E. of Maharak Fort, where there is a fine spring of good fresh water, with the top of a jar fitted to the mouth of it, through which the water gushes. This mode of procuring water at submarine springs is characteristic of these islands.

FASHT-EL-JADEEM, or Fasht-el-Yarem, or Teigmouth Shoal, is a great reef to the N.W. of Maharak Reef, and extends $6\frac{1}{2}$ leagues N. of Bahrein Island, being the outermost of the shoals. The Bahrein Reefs nearly join its S.W. extremity; on the W. side it is separated from the reef that fronts the main to the S. of El-Katif Bay, by a narrow channel of 3 to 4 fathoms, called Khor-el-Bab. This extensive reef, forming the shelter to the harbour against the shemal, is only

partially explored; its extent in a N.W. and N. direction is not determined; the outline delineated on the chart is only approximate, it is probably 10 m. broad by 15 in length N. and S. Its N.E. point, called Ras Shaghab, is the chief danger to be avoided in making Bahrein, as it is out of sight of land; it is 16 m. to N. of the date-trees at the N. end of Maharak Island.

A good look-out from the mast-head might discern these Reyah date-trees at 12 m. distant, when off the E. side of the Fasht-el-Yarem; they should not be brought to bear to the E. of S. The Yarem is chiefly of white sand or soft white stone; and on the N. edge there are many dark patches of rock. It is dry in parts at L. W.; some of the rocks on the N. part uncover at half tide. The whole reef generally shows well, especially with the sun behind you.

Tides. The tides on the pearl-bank N. of the Yarem Shoal, set about E. and W., and influence a ship's course across the gulf, often considerably. Along the E. side of that shoal they set N. and S., and follow the bend of the harbour, setting into and out of it; the flood also sets S.E. between Maharak and Bahrein islands, and N.W. through the Khor-al-Bab. It sets to the S. along the E. side of Maharak Island. Its velocity in the harbour is from 1 to 2 knots. H. W. on F. and C. is at 5½ h.; rise and fall 7 ft. The amount of the rise, and the depths of the water, are dependent to a certain extent on the wind, whether a N.-Wester or a S.-Easter.

Sailing Directions for Bahrein Harbour. Bring Jebel Dukhan, about 400 ft. high, a little to the left of Semahi Date Clump, S.S.W., and keep it so until Galaleh tower and Bisetin high tree (conspicuous objects on Maharak Island) subtend an angle of 19°, then alter course to W. by S., until Galaleh tower just closes behind Reyah Date Clump, and Jebel Dukhan is over the Minarets, S. ½ W. Then, if drawing more than 16 ft. water, steer S. by W. ¼ W. for the Portuguese Fort, and anchor in the outer harbour, with Reyah Date Clump on the N. end of Maharak Island, E. ¼ N. But, if bound into the inner harbour, keep Jebel Dukhan over the Minarets until Sayeh Islet comes just open to the left of all trees at the N. end of Maharak Island; then steer S.E. for Manameh Sheik's house, anchoring according to the depth of water required; but as the water is clear, and the reefs are generally visible, a good look-out from aloft will enable the mariner to avoid the dangers.

The N.W. anchorage is convenient and safe for a short stay in the fine-weather season, and sheltered by the island from S. and E. winds. But in the winter months, or during the season of hard N.-Westers, it is both unsafe and inconvenient, being exposed to the wind and sea in that direction, without any means of communication with the town.

Khor Jaliyeh, the S.E. anchorage, on the E. side of the islands, between the Dibal and Jaliyeh Shoals, in lat. 26° 11' N., is a gut with 6 and 7 fathoms, water, between the reefs of Maharak and Bahrein islands, with a boat passage between them into the other harbour. It is sheltered from all winds and sea by the surrounding reefs, and should always be preferred by a ship intending to remain longer than three days. It is, however, more difficult of access than the former anchorage, and the channel leading towards it between the reefs is so intricate, that a stranger ought not to enter it without a pilot, unless in a case of great emergency, when one cannot be procured. This will seldom happen; for on making the usual **Pilot signal with a gun** at the edge of the reef, a person will come off to conduct you into the port, or the men in the pearl-boats will come alongside, and offer their services for a few rupees.

EL KATIF BAY. Ras Tanurah, the N. point, is in lat. 26° 37½' N., lon. 50° 10' E. This bay is of considerable extent, and has in it the flat island of Tirhoot, or Tarut, which is covered with date-trees, and appears to be well inhabited and fortified. There is a smaller island, called Demmam, 5 m. to the S. by E. of Tirhoot: both of these islands are on the large shoal-bank which nearly fills the bay and lines its W. shore. El Katif Town is on the W. shore of the bay, and bears W. from the centre of Tirhoot Island. There are several craggy hills about 4 leagues S. by E. of the town; the most remarkable of them, 400 ft. high, called Methrah, or the Sugar Loaf, bears from the anchorage off Ras Tanurah about S.S.W.; the other, Jebel Dharan, is 500 ft. above sea, and 4 m. further to S.E.; it stands 5 m. to the W. of Ras Chawachab.

In entering the bay, Ras Tanurah Point may be approached within ¼ m., or less, and a small vessel may haul close round it in 3 or 3½ fathoms, and anchor inside of it in 4 fathoms soft ground; S. ¼ W. ¼ m. from this point, is a shoal-bank of 9 ft.; but in every other place the bottom is hard, and the whole of the bay is nearly occupied by an extensive shoal, projecting 2½ leagues off shore in some places. Having passed Ras Tanurah, steer for the Sugar Loaf till the Island Tirhoot is bearing about W.N.W. and the Sugar Loaf S.S.W.; if you intend to anchor in the S. part of the bay opposite to Saiphat Town, which is 4 m. S.S.E. of Katif, then anchor in 4½ fathoms white sand and shells. El-Katif Bay seems to afford no shelter from N.E. winds, excepting for ships at a moderate draught of water, which can pass close round Ras Tanurah, and be sheltered under it, as mentioned above. The anchorage of El-Katif has the large bank of Fasht-el-Yarem or Teignmouth Shoal to

the S.E., and the passage from the anchorage to the S., between the reefs, as well as that at Bahrein, appears unsafe for large vessels.

APPROACHES TO EL-KATIF. Coming from the N., the **Rennie Shoal**, rocky, least water 16 ft., in lat. $27^{\circ} 4' N.$, lon. $50^{\circ} 42' E.$, is the outermost danger; a vessel, coming from Bushire, should take a good departure* from the lofty land-marks nearly 40 m. S.E. of that port. As the space between Farsi Islet and El-Katif has not been properly examined, no vessel has any business here at night; by day, a good look-out from aloft may discern the shoals when too near.

Fasht Bu Safeh, or Aboo Saafa Shoal, in lat. $26^{\circ} 57\frac{1}{4}' N.$, lon. $50^{\circ} 23' E.$, is very steep, consisting of hard-pointed rocks (some with 3 ft. only,) and patches of sand in various parts, with depths from 2 to 4 fathoms. Lieutenant Archer, commanding the *Ariel*, described the shoal to extend N.N.W. and S.S.E. about 6 m. in a narrow spit, the broadest part of the centre, where the *Durable* was lost, being 2 m. The chart shows it as a separate shoal from the great **Uhm-el-Hamail** shoals, lying to the W. of the above position, which have 2 and 3 fathoms water on them. When the sea breaks on Bu Safeh, a vessel may tell her position; and, passing 2 m. to the E. of it, haul up S.W. by S. for Ras Tanurah and El-Katif. There are several other dangers to the N.W. of the *Durable* Shoal, at 7 or 8 leagues distance from the coast.

Iahairah, or Washir Shoal is a large pearl-bank, about 15 m. to S.E. of Bu Safeh. It is 7 or 8 m. in extent, and has overfalls of from 9 to 10 fathoms; its E. side nearly joins the Bu Amamah.

Rak-es-Sarah is a long shoal, with several 2-fathom patches, the W. end of which lies E. by N. 10 m. from Ras Tanurah, and extends in that direction for 10 m. or 12 m.; there are no known dangers between it and Bu Safeh.

THE COAST to the N. of EL-KATIF. From Ras Tanurah the coast runs in a N.W. direction to lat. $28^{\circ} N.$, and afterwards about N. by W. to El-Koweit; having several projections, contiguous islands, and deep indentations, fronted by dangerous banks in many places. It may be proper to add, that from Bahrein Island to lat. $28^{\circ} 15' N.$, the coast is fronted by numerous coral shoals, some of which lie at the distance of 8 and 10 leagues from the land.

Jesirat Bu Alli is the first large island to the N.W. of Ras Tanurah, and contiguous to the main land. Its extreme E. point, Ras Bu Alli, is in lat. $27^{\circ} 18' N.$, lon. $49^{\circ} 40' E.$, and is a narrow neck of land, with a shoal stretching 2 or 3 m. from it to the E. Shoal sand-banks occupy the deep bights, both to the S. of this neck of land and to the W. of the island; the latter is called Duhut Musalmeeya, the N. point of which is **Ras Biddiah**, whilst the S. side is marked by **Jinna Island**, the N. cliff of which is 35 ft. high.

RAS-EL-GHAR, in lat. $27^{\circ} 33' N.$, lon. $49^{\circ} 15\frac{1}{4}' E.$, is the N. point of Ras Biddiah promontory, it has soft ground $\frac{1}{4}$ to 6 fathoms, about 3 m. distance to the E.; but here, a chain of banks above and under water commences extending along the coast N.W. to lat. $28^{\circ} 14' N.$, projecting in some places $5\frac{1}{2}$ leagues from the shore. The soundings decrease pretty regularly towards the edge of these banks, to 7, 6, or 5 fathoms. **Ras Mishaab**, in lat. $28^{\circ} 11\frac{1}{4}' N.$, lon. $48^{\circ} 39\frac{1}{4}' E.$, is formed of high land, and is near the N.W. extremity of these extensive banks, betwixt which extremity, called Gutar-el-Mitmah, and a shoal that projects $3\frac{1}{2}$ m. from Ras Mishaab, there is an opening 3 m. wide, leading to the S. 3 or 4 m., with depths of 6 to 4 fathoms, exposed only to N. winds, being sheltered to the E. by the chain of banks mentioned above.

The shore from Ras Tanurah to Bunder Mishaab continues a low sandy or stony desert, with a few isolated hills at intervals; it is fronted for nearly the whole distance by extensive reefs, sometimes with passages inside. Several low islets lie off this coast. The sea is not generally so clear as farther to the S., owing to the white clayey bottom found in many parts, and the shoals do not show so well. Many discoloured patches of whitish muddy colour are often seen, which look exactly like shoal patches; but on standing into them, no change in the depth is found. This is apt to mislead the navigator, although the warning of discoloured water cannot safely be neglected. There are no fixed inhabitants or towns on the main on this part of the coast, nor for 60 m. above Mishaab, a coast-line altogether 180 m. in extent. The country above Katif, as far as Koweit, is called Burr-al-Adan; it is frequented by several Bedouin tribes, the principal of whom are the Beni 'Ajaman. The average direction of the coast is N.W. $\frac{1}{4} N.$; the **Great Pearl-Bank** decreases in width off it, and may be said to end about Bu Ali Island, although pearls are fished for on a small scale on some banks N. of that island. This part of the survey is very incomplete.

From Ras Tanurah Ras Abu 'Ali, or Bu Alli, bears N.W. by N. 49 m. The coast between them is desert and has several low hills in places, which serve as land-marks.

Directions for the Inner Channel from Ras-al-Ghar to Tanurah. It should only be attempted by daylight, the vessel anchoring at sunset. A departure should be taken, by sighting Hergooz or

* A light-house on Farsi Islet, in lat. $28^{\circ} 0' N.$, lon. $50^{\circ} 10' E.$, would be a great boon to navigators.

El-Kran Island, and a course shaped for the coast just below Ras-Al-Ghar, which will be seen 7 or 8 m. Take care to pass 1 m. or 2 m. to the N. of Fasht-el-Kash Reef, and give the shoal water off its W. end a good berth. The soundings are not much guide in approaching Ras-el-Ghar, there being overfalls from 5 to 10 fathoms. When the coast is well in sight, or about 4 m. off, haul round to the S.; then steer to E.S.E. for the E. point of Jezirat Bu Ali, which will not be seen more than 5 or 6 m. Pass about mid-way between the E. point of the island and El-Jinnah (the islet which lies about 8 m. to the E. by N. of Bu Ali,) so as to clear the spit off the E. point of Bu Ali; then haul to the S.E. by S., to pass about 1 m. to the W. of El-Jeridah Islet, which is visible 9 or 10 m., and stands 10 m. to the S. by E. of El-Jinnah. After passing Jeridah, keep over towards the coast near Ras Khaweir, till past the shoal patch (nearly dry at L. W.,) about 5 m. E. of that point, when stand along shore, keeping 2 to 3 m. off, till near Ras Tanureh; you may then approach the coast to one mile or less. Attention is required off the high sand-hill called Ras-el-Jayaliyeh, where the shoal water extends about 3 m. off. This point may be recognised by the hill called Fanetis, a short distance to the N.

If working through, too long tacks must not be made off shore, so as to be entangled among the reefs; perhaps, as a rule, it would not be advisable to stand on long after the shore is down.

BIDDULPH ISLANDS are distant about 10 leagues to the E.N.E. of Ras-el-Ghar, and consist of three low sandy islands, surrounded by reefs. Two of them bear nearly N. and S. of each other, distant 4 m.; the S. one, called El-Kran, or **El-Kuran**, 2 ft. high, is in lat. $27^{\circ} 39' N.$, lon. $49^{\circ} 50' E.$, and the other called El-Kraing, or **El-Kurayin**, 5 ft. high, is in lat. $27^{\circ} 43' N.$ The third, and most N., is called Hargooz, and bears N.N.W. 5 leagues from El-Kraing. There is from 9 to 14 fathoms water between El Kran and El-Kraing, and 28 to 30 fathoms a little to the E. To the S. and S.W. of them, towards El-Jinnah and Jezirat Abu Ali, the sea is unexplored and dangerous. **Fasht-el-Kash Reef** lies about 14 m. to W.S.W. of El-Kuran, and a vessel might approach the coast along its N. side, but not without a pilot.

The coast-banks, mid-way between Ras-el-Ghar and Ras Mishaab, extend off shore for 15 m., an entirely unexplored region. Ras Bildani is the name given to the most prominent part of the shoals, in lat. $27^{\circ} 58' N.$, lon. $49^{\circ} 14' E.$; this is 25 m. to the W. of Hargooz Islet.

ISLANDS in MIDDLE of GULF. **Keyn**, or **Araby**, is 6 leagues to E. by N. of the Biddulph Islands; in lat. $27^{\circ} 47' N.$, lon. $50^{\circ} 11' E.$; and **Zazarin**, or **Farsy**, in lat. $27^{\circ} 59' N.$, lon. $50^{\circ} 10' E.$, stands about equi-distant from both Arabian and Persian coasts. They are both low and sandy, not to be seen above 3 leagues from the deck. **Keyn**, the S. one, 3 ft. above water, is a round sand-bank, with a few shrubs on it; the E. point has rocks above water, and sunken rocks extend all round to the distance of $\frac{1}{4}$ m., with over-falls from 20 to 14 fathoms, then to 5 and $3\frac{1}{2}$ fathoms, on which account this island should not be approached nearer than 30 fathoms. **Farsy**, bearing nearly N. from **Keyn**, distant about 4 leagues, is rather larger than the other, and about 10 ft. above sea, having on the N. end a pile of stones, resembling a boat under sail, when first seen. This island should not be approached nearer than 32 fathoms, there being 25 fathoms about 1 m. from it on the N. side, and 22 fathoms very near it to the S. These isles are frequented by turtle and large birds. Ships seldom stand so far from the Persian shore as to see them, being dangerous to approach in the night.

The Coast from Ras Mishaab to Ras el-Zaur, about 12 leagues, runs N. by W., the general direction before having been about N.W. About 4 m. N.N.E. from Ras Mishaab, and 4 m. off shore, lies a small reef (**Gussar Uhm-es-Sahal**), to the N. of which the soundings decrease gradually to 4 or 3 fathoms towards the shore in most places, as far as Ras-el-Zaur; but from the two inter-jacent points, one in lat. $28^{\circ} 25' N.$, the other, called Ras Burd Halj, in lat. $28^{\circ} 19\frac{1}{4}' N.$, shoal-banks extend out about from 3 to 1 m. from the shore.

Uhm-el-Maradim, in lat. $28^{\circ} 41' N.$, lon. $48^{\circ} 40' E.$, a low sandy islet, covered with brush-wood, bears from Ras-el-Zaur about E. by S., distant 15 m.; it stands on a shoal which lies E.N.E. and W.S.W., about 1 m. long, and affords anchorage and shelter in a N.-Wester, with the islet bearing N., 3 cables off. A small reef lies a little over 2 m. to the N.N.W., on which one rocky patch is dry at half-tide.

Jezirat Garoo, in lat. $28^{\circ} 49' N.$, lon. $48^{\circ} 47' E.$, another sandy islet, only 3 or 4 ft. above high tide, lies 10 m. to N.E. of Uhm-el-Maradim; there is also a small detached reef at $1\frac{1}{4}$ m. to N.N.W. of this islet. **Jezirat Kubbar** lies 21 m. to N.W. of Garoo.

Jezirat Kubbar, in lat. $29^{\circ} 4' N.$, lon. $48^{\circ} 30' E.$, stands 25 m. to S.E. of the entrance of El-Koweit Harbour. It is a low, white, sandy islet, covered with brush-wood, in a general depth of 16 or 18 fathoms; and it is 17 m. from the nearest shore. From it to the N., the soundings gradually decrease, till at 5 m. off there is 7 fathoms; then there seems to be a mud-flat with 6 and 7 fathoms all the way to Khor Abdullah.

Ras-el-Zaur, or **ez-Zaur**, in lat. $28^{\circ} 44' N.$, lon. $48^{\circ} 25' E.$, is the S. point of a bay called **Duhet-az-Zaur**, formed between it and **Ras Jilliah**, or **Kulaiah**, the N. extreme in lat. $28^{\circ} 53' N.$, both of which points have reefs fronting them; and the bay is rocky and unsafe to approach within 4 m. of the shore, excepting about 2 m. to the S. of **Ras Jilliah**, where there is a space of clear ground, with depths of 8, to 6, or 5 fathoms, where vessels might be sheltered from all winds between S. and N.W. From **Ras Jilliah**, the shoal-spit projects 5 m. to N.E., having from 6 to $1\frac{1}{2}$ fathoms on it, and 6 or 10 fathoms near its edge: and at 7 m. to N. by W. from **Ras Jilliah**, and 4 m. off shore, lies the reef named **Guttah Arifan**, or **Kitaat Uraifyan**, having 7 fathoms close-to, and the same depth inside till near the shore, which is safe to approach by the soundings, from **Ras Jilliah** to the entrance of **Kuweit Haven**.

Ras-el-Ardh, in lat. $29^{\circ} 21' N.$, lon. $48^{\circ} 8' E.$, is the S.E. extremity of the entrance into **Grane** or **Kuweit Haven**, distant $13\frac{1}{4}$ leagues from **Ras-el-Zaur**. From the latter place, along this part of the coast, there are regular soundings of 6 and 7 fathoms near the main, increasing to 18 fathoms by the islands **Kubbar** and **Garoo**.

EL-KUWEIT, or **GRANE**,* in lat. $29^{\circ} 23' N.$, lon. $48^{\circ} 0' E.$, is inhabited by Arabs, who have been long famed for their commercial spirit; and they employ a large number of vessels in trading to the Red Sea, Sind, Guzerat, and other places on the W. side of India, from whence they import coffee, grain, and Indian produce, for the supply of the interior. The haven is secure in most winds, where ships lie sheltered in 5 or 6 fathoms, about 2 m. to the N. or N.W. of the town, which is situated on the S. shore: but a rocky bank of 2 fathoms must be avoided, that lies N. from the town nearly 2 m. distant. Small vessels may anchor in 4 or $3\frac{1}{2}$ fathoms within the rocky bank, and to the N.W. of the town, at $1\frac{1}{2}$ m. distance. This haven stretches a considerable distance inland to the W. of the town; but its shores, particularly the projecting points, are lined by reefs, which must be avoided in sailing into the haven. The shoal-bank fronting the N. shore projects 3 to 5 m. off, uniting the shoal-water that environs the island **Failakah**, to the E. of **Kuweit**, leaving no passage between that island and the N. shore, except for boats. Although in the channel leading to **Kuweit Haven** the depths decrease gradually on either side, so as to render the soundings a guide, yet it is advisable, after passing **Ras-el-Ardh**, to keep about 2 m. from the S. shore, until the town-point, **Ras Ahjooseh**, is approached; and anchor in 6 or 7 fathoms, with the town bearing either S.S.W. or S.S.E., to avoid the rocky shoal bearing N. from it, as mentioned above.

El-Kuweit is one of the most important towns on the Gulf: it contains about 25,000 inhabitants, of the **Uttubi** tribe (**el-Subah** branch). It is situated on the S. side of a fine clear bay 20 m. long, E. and W., by 10 broad, with water of a suitable depth for anchorage all over (10 fathoms and under), and good holding-ground. In a shemal a considerable sea gets up in the bay, but not enough to distress a large vessel; though of course there is a surf on the beach under the town, which is with N.W. winds a lee-shore.

The town commences a mile W.S.W. of **Ras Ahjooseh**, and extends a mile along the shore; it is surrounded by a low wall with towers, in a ruinous state, and there is a large suburb of mat-huts outside the walls. It is a nice-looking place, the houses being mostly of stone and sun-dried bricks. There is a detached tower near the walls about a mile S. of the town. Shoal water extends about $\frac{1}{2}$ m. off the town, and the beach dries off a considerable distance, but at H. W. the sea washes up to the houses; the native boats are hauled up on the beach opposite the town, and are protected from the sea by substantial break-waters of loose stone, within which they lie aground. Variation $1^{\circ} 45' W.$

The whole country round being quite desert, all white sand, the place is entirely dependent on its trade for support; it possesses more **baghalahs** than any port in the Gulf, which trade to India, but it only sends about forty boats to the pearl fishery; the **Kuweit** boats only fishing as far S. as **Jezirat Bu 'Ali**. They have one hundred and thirty vessels from 20 to 300 tons. Being a warlike united tribe, they are much respected, if not feared, by other tribes, and none venture to attack them. They acknowledge a nominal subjection to Turkey, and fly the Turkish flag, but pay no tribute; the chief on the contrary receiving an annual present from the Pasha of **Basrah**. Their vessels bring dates from **Basrah**, which they take to India, &c.; and many of the horses sent to India are shipped from this port. From India they bring timber, rice, &c.; they also do much of the carrying trade for other ports in the Gulf. **El-Kuweit** is much visited by the **Bedouin**, who bring horses, cattle, &c., which they barter for dates, clothes, arms, &c.; there are generally one or two **Bedouin** camps near the town. The border of that part of Arabia called **El-Hasa** is two days'

* **El-Koweit** has been recommended as the terminus for the **Euphrates Valley Railway**, we may therefore expect that one or more light-houses will be soon erected in its vicinity, and on at least one of the out-lying islets.

journey from this place. Cattle may be procured, also poultry, and some vegetables; fire-wood dear and scarce, water indifferent.

Tides. It is H. W., F. and C., at El-Kuweit at 12-30; rise and fall at springs 9 ft.

Ras Ahjozeh, or Old Woman's Cape, is a low point 6 m. W.N.W. from Ras-al-Ardh, the coast between the points forming a bay with shallow water, so that vessels should not stand within the straight line between these points. A rocky flat, dry at L. W., with fish-weirs on it, extends $\frac{1}{2}$ m. off this point. Native boats anchor in shelter during a shemal on the E. side of this cape, with the point bearing N.N.W., $1\frac{1}{2}$ m. off; here the rocky flat shelters them. There are three small forts near the shore, between this and Ras-al-Ardh, and nearer to the latter point. From this the coast runs 9 m. W.S.W. to the bottom of a shallow bay called Duhet-abu-Taleh. At about 3 m. to W. by S. of Kuweit, and $\frac{3}{4}$ m. off shore, is **Jezirat Korein**, an insignificant islet, 30 or 40 ft. high, from which (it is supposed) the Indian Navy Surveyor, Captain Brucks, took the name of Grane, which he applied to the harbour of El-Kuweit. The anchorage for small craft, to S.E. of Korein, is called **Bunder Shuweik**, and shelters from all winds.

Fusht-el-Hedebeh is a rocky 2-fathom shoal, $1\frac{1}{2}$ m. to N. of the E. end of the town. The passage to the anchorage, with 3 to 5 fathoms in it, is between this and the town-reef. The anchorage for large vessels off the town is called **Bunder Toweineh**; it is in $3\frac{1}{2}$ to 4 fathoms, with the town E.S.E., $1\frac{1}{2}$ to $1\frac{1}{4}$ m. By standing well in close to the large native vessels, a ship would be sheltered from the shemal by El-Ahkaz Reef, the point of which bears N.W. about $2\frac{1}{2}$ m. from the W. end of the town.

Duhet Kathemeh is the bay at the W. end of Kuweit Haven. This shore has cliffs, some 50 ft. high, and hilly ground behind, about 200 or 300 ft. above the sea. The deep water approaches nearest to the shore about the N. point of Duhet Kathemeh, called also Jahreh, which bears about W. by N. $\frac{1}{4}$ N. 8 m. from Kuweit town. Here a depth of 20 ft. is found within 1 m. of the cliffs. **Jahreh** is a place a short distance inland, where there is a little cultivation near the ruins of an ancient town called Timeh, which are said to be very extensive, but have not been visited by Europeans.

The N. shore of Kuweit Bay is called El-Aghthey; it is several hundred feet high, and level on the top, and of dusky brown colour; apparently stony hills, ending towards the sea in a steep declivity. It curves gradually round from the bottom of Duhet Kathemeh to the entrance of Khor Subbeyeh, a creek running up along the W. side of Bubiyan Island. A mud flat extends some distance off, increasing in width to the E., and off the E. part, as much as 4 or 5 m. in breadth, with soundings on it under 2 fathoms. Due N. of Kuweit, a depth of only 3 fathoms is found fully 4 m. off that N. shore; but 7 fathoms is found within 3 m. of Kuweit.

Failakah, or Phelche Island, off the entrance of Kuweit Harbour, is all very low, except a small mound with a tomb at its S.W. corner, which is visible 7 or 8 m. The Island extends in a N.W. and S.E. direction about 7 m., and is from 2 to 3 m. in breadth; the chief town is situated on the N.E. side of the Island, in lat. $29^{\circ} 27' N.$, lon. $48^{\circ} 18' E.$, or about 6 leagues to the E. of Grane. The small sandy island of Meshkan lies 2 m. off the N.W. end of Failakah, and the shoal-banks which extend several miles around it, and dry at $3\frac{1}{2}$ m. distance from the E. point, at L. W., break off the sea from Kuweit Haven, when the winds blow from the E. A little sandy islet, in lat. $29^{\circ} 22' N.$, lon. $48^{\circ} 22' E.$, called **Uhah** or **Aoheh**, stands about 1 m. within the E. point of Failakah Shoals; this bears E. about 14 m. from Ras-el-Ardh. The soundings near the edges of the banks, on the S. and S.W. sides, decrease to 3 and 2 fathoms, there being from 9 to 14 fathoms water in mid-channel between them and Ras-el-Ardh, which depths continue to the entrance of Kuweit Haven, thence decrease to 8 and 7 fathoms, and to 6, 5, or 4 fathoms at the bottom of the Haven. From the Island Failakah to Basra Bar, shoal-banks project far out from 8 to 14 m.

DIRECTIONS for making and entering Kuweit. By day Kubbr Island may be sighted; but by night it would be advisable not to deepen the water to more than 10 fathoms, on the S. side of the flat called Bu Jezzeh, in order to avoid that island. The principal danger outside the harbour is the spit extending to S.E. of Failakah Island. When opposite Kubbr, the main land would be sighted. The land below Ras-al-Ardh may be approached to $\frac{1}{2}$ m., or even less. The hill-fort, standing 5 m. to S.W. of that point, bearing W. will clear the 3-fathoms flat S. of Failakah, which island would probably not be sighted. Ras-al-Ardh, which is very low, is steep-to, and may be approached quite close, till it bears S.; then a vessel should keep further off, when entering Kuweit, for H.M.S. *Vigilant* in 1865 found less water off this point, having grounded to N.N.W., about 1 m. from the point.

If working in, the lead will be a guide to tack on the Failakah Flat, after passing Uhah Islet, except just opposite this point, where 10 fathoms are very close to the shoal water. Let it be remembered that the S. extreme of the **Failakah Shoals** extends fully 7 m. to S.S.W. of Uhah

Islet. After passing that part, the lead is again a good guide on the N. side of the bay. After passing Ras-al-Ardh, do not stand into the bay between it and Ras Ahjozeh, which latter may be passed $\frac{1}{2}$ m. off; the rocks off it are dry at L. W., and at half-tide, the fish-weirs on it serve as a mark. Stand between the shore-reef and Fusht-el-Hedebah, which latter, by day, will be seen, or by attention to the lead, may be avoided, as the water-shoals regularly, but quickly, on to its edge. It is, perhaps, preferable to feel the way along the edge of the shore-reef, hauling out, if a shoal-cast is obtained. Anchor in $3\frac{1}{2}$ to 4 fathoms, with the town about E.S.E. Vessels anchoring outside the Hedebah Shoal, or with the town S. by W. to S.S.W. would not be much sheltered in a shurgi. There is generally a light land-wind in the morning in fine weather, and in the afternoon fine sea-breezes from S.E. to E., which are felt some distance down this coast, and as far out as the group of islets off it.

JEZIRAT BUBIYAN is a large low island, 26 m. in length N. and S., by 12 in breadth; it is quite barren, and partly overflowed at H. W., and the soil impregnated with salt. Its S. point, called Ras-el-Abreshah, is 7 m. N.N.W. from Failakah Island. Its W. side is nearly connected with the main its whole length, being only separated from it by Khor Subbeyeh, which is about $\frac{1}{2}$ m. in width, and has 2 to 5 fathoms in it; but its mouth, which is on the Tharub Flat, is shallow, and has several nearly dry patches off it.

At the N. end of Bubiyan lies the island of Wurbah, separated from Bubiyan by Khor Subbeyeh, and from the main by a channel, which has a creek leading from it to N., navigated by small native boats for some distance to a place called Duweireh, or Khuweireh, the port of Zobeir, which is a large town, 10 or 12 m. S.W. of Basrah, standing on a swampy desert plain. This channel has not been explored; the information here given is from various authorities; it is supposed to have been an ancient canal.

KHOR ABDALLAH is a great inlet, having Bubiyan Island on the W., and the Abdallah Banks (which form the W. side of the Shat-al-'Arab) on the E. It is 12 m. wide at its entrance, and runs to N.W. to Wurbah Island, joining Khor Subbeyeh. The soundings in it are 4 to 5 fathoms. It is never visited by European ships. The entrance to it has not been sounded across, but the chart shows a sort of bar with 3 fathoms. Off the E. point of Bubiyan, and at the entrance of Khor Abdallah, lies a detached bank of hard sand, called Fasht-el-Aish, dry at L. W. in places, about 8 m. in length, and running nearly parallel with Bubiyan Island, with a 3-fathom channel between them. The S. tip of this reef is 6 m. off the island, and in lat. $29^{\circ} 43' N.$, lon. $48^{\circ} 30' E.$, the soundings are 3 and 4 fathoms close to it.

The sand-flat, connecting Failakah and the main, continues on the S.E. side of Bubiyan to a distance of 2 to 3 m. off, and 3 fathoms are 6 m. off the low and swampy shore of this island.

NORTH COAST OF GULF OF OHMAN AND PERSIAN GULF.

(VARIATION AT RAS JASHK, $1^{\circ} W.$; AT BUSHIRE, $1\frac{1}{2} W.$)

General Observations.—Ras Jashk to Bushire. This coast has ranges of mountains of great height extending its whole length, at a short distance from the sea, forming good land-marks. There are numerous villages and towns along it, with a mixed Persian and Arab population; the fishermen, or sea-faring portion, being Arab, and the cultivators, &c., chiefly Persian. Most of the towns have date-groves, and a small amount of cultivation near them, but other trees are few and small, except at a few places, where a banyan-tree is met with. The coast from Khamir to the S.E., with the islands El-Kishm, Hormuz, and Larek, are held by the Sultan of Maskat, who pays a tribute to the Persian government for the part N. and W. of Minab, and has garrisons at the principal places. W. of Khamir, it is more directly under the Persian government. The Arab chief of Linjah, who pays a tribute to the Persian government has authority over the islands Sirry, Nabyu Faroor, the Great and Little Tumbs, and Bu-Moosa. The principal sea-port of Persia is Bu-Shehr, generally known as Bushire. Basrah or Bussorah belongs to the Turkish government.

Ras Jashk, or Cape Jask, in lat. $25^{\circ} 38' N.$, lon. $57^{\circ} 46' E.$, bears about N.N.W. from Maskat, distant $42\frac{1}{2}$ leagues; it is a low projecting cape, with an old tomb on a low cliff at the S. point, 25 ft high, and two banyan trees about 3 m. to N.E. of the tomb. The town of Jashk is about 6 m. to the N. of the cape. **Jashk Bay**, or Bunder Mukhsu, is to the W. of the cape, and affords shelter from E. winds; but, if a shemal come on, a vessel must run round the cape and anchor in 6 fathoms with the tomb bearing W. by S., about 2 m. off.

The Coast to E. of Ras Jashk runs E.N.E. for 9 m., then curves to S.E., forming a deep bay, the E. point of which is Ras Zegin or Jagin; a low point, 16 m. E. by S. $\frac{1}{2}$ S. from Jashk

Cape, and quite clear of danger. There is deep water close to it, 20 to 30 fathoms being within 2 m., and the bay has also deep water, except towards the head. On the W. side of Zegin is a small creek called Khor Lash.

The Coast from Jashk to Gru is very low, there being a plain of varying width between the mountains and the sea. It is throughout deep-to, and the soundings are little guide. Supplies are not easily obtainable at any of the villages, which all lie a short distance inland. Except at Jashk, there is no shelter on this part of the coast in a shemal, and the anchorage is bad, being close to the shore, owing to the depth of the water. The low coast being only visible a short distance, a stranger, seeing only the hills, is apt to be misled as to his distance off shore. The survey of the coast, to the N.W. as far as Hormuz, is very incomplete, with only a few soundings carried along close to the shore. Navigators should be reminded of this.

There are several ranges of mountains one behind the other, and the lower range approaches within 5 m. of the coast; the most remarkable of them is an isolated, quoin-shaped mountain, 1,630 ft. high, the bluff or highest part to the W., called generally **Jashk Quoin Hill**, lying N. by W. $12\frac{1}{2}$ m. from the cape: with this bearing it is a good mark for making the place. It cannot be mistaken, always shows well against the hills behind, and is visible 40 m. At 12 m. E.N.E. from Jashk Bay, there is a light-coloured bluff, 1,720 ft. high, forming the E. extreme of the hills, which fall back beyond it, and recede from the shore. From this bluff the range runs W., behind the Quoin Hill, and higher mountains are seen over it.

Jebel Shahu, (formerly Chouse, or Shouse,) about 5,000 to 6,000 ft. elevation, stands 44 m. to N.E. from Ras Jashk, visible 70 to 80 m. **Jebel Dunghir**, 3,130 ft., is a conspicuous mountain, at 7 m. to N.W. of the Quoin Hill, and quite separated from it; having a long slope down to the S., and a very serrated outline. On the S. slope is a remarkable natural pillar of rock. To the W. of this hill there is a great valley between it and the hills N. of Ras-el-Khor. **Saddle Hill**, 700 ft. high, stands 5 m. to E. by N. of Koh Mubarak. To the N. of the latter, a range of hills runs parallel with the coast at the distance of 2 or 3 m., and **Jebel Bees**, 4,600 ft. high, stands 8 leagues to the N.E. by N. of Koh Mubarak. When abreast of Koh Mubarak Rock, with a steady S. wind, a course may be steered N.N.W., keeping within 3 or 4 leagues of the Persian shore; but with light variable winds, this shore ought to be kept aboard, to preserve anchoring-ground, which is got from 2 or 3 m. to 3 or 4 leagues from the E. shore. The depths are 50 and 60 fathoms about mid-channel, in the entrance of the Gulf, increasing to 70 and 80 fathoms near the Arabian shore. The *Scorpion* drifted in 3 hours, from 52 to 104 fathoms, and was obliged to anchor in this depth, within a few miles of the islands close to Cape Masandim, the current setting strong to the W. among the islands around that cape.

Koh Mubarak, the Blessed Hill, called also Bombarak Rock, about a mile from the beach, in lat. $25^{\circ} 50\frac{1}{4}'$ N., lon. $57^{\circ} 19'$ E., and about $9\frac{1}{4}$ leagues N. by W. of Cape Jashk, is an isolated remarkable rock of square form, discernible from a considerable distance at sea, and when it bears N.W., a perforation is perceived in its E. and upper corner, which is a mark for the **Koh Mubarak Shoal**, in lat. $25^{\circ} 43'$ N., bearing S.E. from Koh Mubarak Rock, distant about 4 leagues: and if the perforation of the rock is kept open, it will carry a ship well to the S.W. of the Shoal, which consists of lumps of rock, with clay between them. This rocky Shoal is about $\frac{1}{4}$ m. long, having on the shoalest part $1\frac{1}{4}$ fathoms water, and close to it 10, 8, and 7 fathoms, clay.

Ras-el-Khor, or **el-Kuh**, formerly called Ras Kerazi, or Cape Koh-i-Mubarak, in lat. $25^{\circ} 48'$ N., distant about $2\frac{1}{4}$ m. directly to the S. of Koh Mubarak Rock, is a projecting head land, at which the coast changes its line from W. by N. to N.W. Ships passing this part of the coast at night ought not to borrow under 15 or 16 fathoms, particularly when near the situation of Koh Mubarak Shoal, nor approach it nearer than 12 fathoms in the day. When Ras Kerazee bearing about N.N.E., the *Phanix* is said to have shoaled to 4 and $3\frac{1}{2}$ fathoms on a bank, then 4 m. off shore, and another ship grounded by keeping too close in with the land of this cape.

Ras-as-Sheer, in lat. $26^{\circ} 0\frac{1}{4}'$ N., about 5 leagues N.N.W. from Ras-el-Khor, is a projecting head land, having a quoin-shaped hill, 720 ft. high, on the near range, and bearing E. by S., $3\frac{1}{4}$ m. from the cape. **Jebel Kurrye**, a light-coloured peak, 1,900 ft. high, stands 11 m. to N.N.E. of Ras-as-Sheer, and is visible 45 m. The high mount, **Jebel Bees**, 4,600 ft. in height, is about 15 m. nearly E. from the latter. A 2-fathoms flat, of sand and mud, extends about $2\frac{1}{4}$ m. off Ras-as-Sheer; it is steep-to, as 20 fathoms is found only $1\frac{1}{4}$ m. outside of it.

The Coast from Ras-as-Sheer runs to N. by W. for 12 m., then projects a little to W.N.W. for 1 or 2 m., and this point (**Ras Kanari**) has a 4-fathoms shoal at 2 m. to the W. of it, in lat. $26^{\circ} 11'$ N.; thence the coast trends N. by W. to Gru or Kau, a small village with fort in lat. $26^{\circ} 35'$ N. The coast is composed of sand-hills, 30 or 40 ft. high, and there seem to be shoals off it. Therefore a ship should give it a berth of about 1 league, unless wanting to anchor, on account of a contrary tide.

Directions for the coast from Jashk to Gru and Hormuz. The tide is little felt before approaching Ras-el-Kuh; it sets strong round that point, and along shore N. of it, probably 2 to 3 knots at springs. The tide hour is from about $9\frac{1}{2}$ to $10\frac{1}{2}$, the stream running two to three hours or more after H. or L. W.

After passing Jashk the Arab coast would be seen in very clear weather even before reaching that cape. Care must be taken in passing **Mason Shoal**, $3\frac{1}{2}$ m. W. by S. from Jashk: off that point and Ras-el-Kuh, the soundings are too deep to be much guide to a vessel; but 25 fathoms would be a safe depth between them, which will take her 2 m. outside Koh Mubarak Shoal. N. of Ras-el-Kuh, a vessel ought not to come under 30, or by night 35 fathoms, till past the low point of Kanari, in lat. $26^{\circ} 12' N.$, when she may stand in, if a working breeze, to 8 or 10 fathoms by day, or 15 by night, as far as Hormuz Island. With a fair wind, by keeping in 40 fathoms by night, she would round the Quoins at a proper distance; if she deepened her water to 50 or 60 fathoms, she might get too near those islands, if a thick night; by day, the eye is a good guide: 7 or 8 m. is a good distance off them.

It is not advisable to approach the coast near Gru, or between it and Hormuz, if a shemal is likely to set in, as that wind blows here at W.S.W. with a very bad sea, and it would be dangerous to become embayed between Gru and the Minab Khor. No native vessels visit the coast, except such as can either be hauled up, or get into the creeks. Hormuz is the only available place of shelter, unless a vessel were far enough to windward to fetch into Kesm Roads. The hills from Gru to Bunder 'Abbas recede from the sea, leaving a large level district between them and the sea, from 10 to 20 m. or more in width, some parts of which are fertile.

The Coast, except just above Gru, is quite low and swampy, with mangroves in places. The 3-fathom line is about 2 m. off shore; and there is no danger on the coast. Khor Minab is a salt-water creek about 17 m. to the E. of Hormuz Island. Doubtless this low swampy ground, in this sudden bend of the Persian coast, accumulates from marine deposits brought by the tides through Clarence Strait and the washings from the hills. This part, as far as Hormuz, is seldom visited by Europeans. Inland are very high mountains, on some of which snow lies for some months.

Minab Town, or Minao, is about 10 m. inland, and 38 m. to the N. of Gru. The Sultan of Maskat has a garrison of one hundred Arabs here. The district of Minao, which produces much corn, is under an agha, who pays a tribute to the ruler of Maskat. The ruins of Old Hormuz (devastated by the Tartars in the 12th century) lie about 6 or 7 m. to S.W. of Minao, up a creek, and about 20 m. to the E. of the present Hormuz.

Mountains. Behind this place are two remarkable peaks on the back range, about 3,000 ft. high; the N. one has a very jagged outline, and the S. one called on the chart, Overhanging Peak, in lat. $27^{\circ} 5' N.$, lon. $57^{\circ} 15' E.$, is a very sharp pinnacle, of about the same height, and, when bearing N.E., forms in the shape of ass's-ears. These two hills are at either end of a long level-topped range. Jebel Shemil, 8,500 ft. high, is a grand mountain, in lat. $27^{\circ} 35' N.$, lon. $56^{\circ} 40' E.$, 30 m. from the coast, and visible 100 m. It lies N.E. of Bunder 'Abbas, and is very conspicuous from the entrance of the gulf, being seen below Uhm-el-Fiyarin. Its top forms in a bluff at the W. side, and to the E. of it, on a lower part or spur of the mountain, is a remarkable cone, about 5,000 ft. high. Jebel Ginnoh, 7,690 ft. high, 16 m. N.N.W. of Bunder 'Abbas, forms a grand detached mountain mass, of irregular outline, with no very marked peak, and is visible 90 m. There is a great valley between it and Shemil, through which is seen, in clear weather, a great mountain, called Jebel Bakhun, rising to a height of 10,660 ft., which is 42 m. to N. of Bunder 'Abbas, and makes with three little peaks. It is covered with snow during many months.

The Coast from the Khor Minab runs in an average direction W. by N. for 26 m. to Bunder 'Abbas. It is all low, desert, and swampy, and the E. part covered with mangroves; there is a mud flat off the whole extent, and 3 fathoms are about 2 m. off it. Nine miles E. of Bunder 'Abbas, the coast projects, forming a point opposite to the island of Hormuz.

BUNDER 'ABBAS, or Gombroon, in lat. $27^{\circ} 10' N.$, lon. $56^{\circ} 17' E.$, is a large town at the bottom of a bay in the N. part of this bend of the gulf. The town stands on the beach, bearing W.N.W., and 10 m. from Hormuz anchorage. It has a frontage of $\frac{1}{2}$ m. to $\frac{3}{4}$ m. The ruins of the old European factories are conspicuous; one of these, the Dutch, is in good repair, and the residence of the Sheikh, a large building fortified with a wall and towers. At $\frac{1}{2}$ m. N. of the town, are about a dozen tombs of European residents, some large and pretentious erections, but no inscriptions; the largest is a pyramid about 30 ft. high. It is a place of great trade, and has a very fluctuating population, as, during the hot season, which is here almost insupportable, most of the population migrate to Minab, or other places. During the cold season, there may be 10,000 to 12,000 inhabitants. The town is defended by a wall, with round towers at intervals, all more or less ruinous; and there is no cultivation or date plantation near it.

The Sheikh of this place is governor, for the Sultan of Maskat, of the country between Shemil and Khamir, and has authority over the Sheikh of Kesm. This town is the port of Kirman: many baghalahs belong to it, or call there on their way from Bu-shehr to Bombay. The principal articles of trade are: sulphur from Khamir to Maskat; salt from Hormuz to Maskat; corn and dates from Minab to Maskat: wool, carpets, asafœtida, &c., from the interior to Bombay. Imports: piece goods, rice, &c., sent into the interior. Some supplies, as cattle, vegetables, rice, &c.; and water, are procurable. The landing at L. W. is bad, as the beach dries off a long way.

Directions for approaching Bunder 'Abbas. If working through between Hormuz and the main, there is no danger on the island side, but the edge of the mud flat lying off the main land has 6 fathoms close-to, and it runs a long way off from the low shore. If passing between Larek and Hormuz, there is no reef off Larek, but the shoal water off the S.W. side of Hormuz has not been properly explored, and requires caution in passing it, being steep-to. If working in, a vessel should not stand over nearer to Kesm town than $1\frac{1}{2}$ m., or should not deepen her water approaching it to more than 27 fathoms, the deepest water being close to the edge of the 3-fathom bank off that place: the water also deepens on approaching Larek Island.

Clarence Strait, or Khoriyeh, is described further on at page 266.

ISLANDS OFF PERSIAN COAST AND CENTRE OF GULF.

HORMUZ, or ORMUS, a nearly round island, with a central peak, 690 ft. high, in lat. $27^{\circ} 4' N.$, lon. $56^{\circ} 28' E.$, distant 10 m. S.E. by E. from Bunder 'Abbas, and the same distance N.N.E. from Larek, and of similar extent, has a fort at the N. end. This island has a rugged appearance, and several of the high peaks are white; the hills, with the remarkable exception of the white peaks, are all of salt. The Imaum of Maskat farms this island from the King of Persia at present, and obtains a small revenue from the rock-salt; he also farms the town of Gombroon, and keeps an armed force there. There are said to be two cisterns or tanks of fresh water on the N.W. end of Hormuz. The entire E. shore of the island appears safe to approach within $\frac{1}{2}$ m., but the W. shore is fronted by a bank, commencing from the N. and S. points of the island, and gradually widening till it forms a rocky spit to the S.W. in the direction of the town of Kishm; the extreme point of the spit is $1\frac{1}{2}$ m. off shore.

Anchorage may be had in 4 or 5 fathoms, with the fort bearing W., and $\frac{1}{2}$ m. off; the native vessels run to the W. of the fort if a nashi comes on. On the N.W. side of Hormuz, there is good shelter from S.-Easters, by anchoring in 6 or 7 fathoms mud at L. W., the fort bearing E. by N., the S.W. bluff point S.E. by S., off shore about 2 m., towards which the depths regularly decrease, but there is a 3-fathoms shoal at 2 m. to the N.W. of the island.

The channel between this island and the E. end of Kishm, is 2 leagues wide and very safe; that between it and the main has depths from 5 to 10 fathoms, and is also safe, by keeping within a mile of the Fort Point, as a shoal-bank extends from the coast more than half-way towards the N. point of the island. When the Portuguese possessed the city of Hormuz, it was one of the richest in the E., and a place of great trade: but after being taken by Shah Abbas, king of Persia, with the assistance of the English, the trade was removed to Gombroon.

LAREK ISLAND, 510 ft. high, 9 m. S.S.W. of Hormuz, and $4\frac{1}{2}$ m. S.E. of the E. end of Kishm Island, is about $5\frac{1}{2}$ m. long and $3\frac{1}{2}$ broad; it is barren, with very few inhabitants, and bears nearly N.N.W. from the Great Quoin, distant 7 leagues, its S.W. point being in lat. $26^{\circ} 49\frac{1}{2}' N.$, and lon. $56^{\circ} 20' E.$ About one-third from the W. end stands a remarkable conical hill, very perfect in form; but the highest peak, of a square form, stands 1 m. to N.E. of the cone. There is no danger within $\frac{1}{2}$ m. of this Island.

EL-KISHM ISLAND, or Jezirat-et-Tawilah, the largest Island in the Persian Gulf, extends about 20 leagues E.N.E. and W.S.W., the central part being 4 to $4\frac{1}{2}$ leagues broad; but to the S. of Laft, or to N.W. of Hanjam Island, it is not 3 leagues broad; thence to Basiduh its breadth is from $2\frac{1}{2}$ to 2 leagues. It lies parallel to the Persian coast, being separated from it by **Clarence Strait**, for which the natives appear to have no general name, except **Khoriyeh**, or the **Straits**. There is a good channel between Kishm and Larek; but in rounding the E. end of Kishm, the sand-bank which fronts the shore of the Island, at $1\frac{1}{2}$ m. distance, must be avoided. This bank extends in a narrow spit from the grove of date-trees on the E. extremity along the shore, 4 m. past the town to N.W., having 2 fathoms water on it.

Kesm, or Kishm Town, in lat. $26^{\circ} 57\frac{1}{2}' N.$, lon. $56^{\circ} 17\frac{1}{2}' E.$, at the E. end of the island, is walled round, and has a small oblong fort within the walls. To the N. of the Town, the spit of and is changed into a mud-bank, about $1\frac{1}{2}$ m. from the shore, and running parallel to the shore as before described. Ships may anchor off the town, well sheltered from W. and S.W. winds; the

Ternate in 4½ fathoms at L. W. spring tides, had the fort of Kishm bearing S., distant about 2 m. H. W. at 10 h. on full and change of the moon; the flood runs about W.N.W., and rises 12 ft. From Kishm Town the coast stretches about N.W. 2 m., then W. and W. by S. in an irregular line for 27 m., to Luft Point, a prominent cape jutting out to N.W., and leaving a deep passage of little more than 1 m. in breadth between this island and the Persian shore; thence it turns round abruptly to the S.S.E. towards the formerly piratical port of Luft, in lat. 26° 54' N., lon. 55° 46' E., which lies on the bank of a deep inlet formed by several swampy low islands, that fill the bay of Luft (or Luft) both to the W. and S.W.

The S. coast of **El-Kishm Island**, from the E. extremity, is a little concave to the small town of Shuza, in lat. 26° 48' N., near which there is a ruined pagoda. From hence to Messain, 5 m. farther, it forms a bay, and from this village to **Ras Kharguh, or Overfall Point**, opposite to the Island Angaum, the coast extends nearly in a direct line. The usual depths along this part of the coast, and about a mile off shore, are from 14 to 16 fathoms till you come to Ras Kharguh, which must be approached with caution, being fronted by foul ground and irregular soundings of 6 to 4 fathoms, at 1½ m. distance.

HENJAM, or ANGAUM ISLAND, commonly called Anjar, situated close off the S. side of El Kishm, nearly mid-way between its extremes, is of oblong form, elevated 350 ft., and about 5 m. in extent; its S. point is in lat. 26° 37' N., the N. point in lat. 26° 41' N., lon. 55° 54' E. The channel between El-Kishm and the N. point of Henjam is ¾ m. wide, but contracted by the banks on each side. It affords good anchorage in 9 or 13 fathoms sand, with the N. sandy point of Angaum bearing about W., off shore from ¼ to ½ m.; this anchorage is called **Henjam or Angaum Sound**, which shelters from all prevailing winds. To enter it from the S.E., keep one-third channel over from Angaum, but do not come under 7 fathoms toward it, nor nearer than 3 cables' lengths, as from 6 fathoms the water shoals at once to 2 or 1½ fathoms in some places; and be cautious not to approach Overfall Point on the El-Kishm shore mentioned above. In Deristan Bay, to the N. of Angaum, there are some overfalls from 14 or 15 fathoms to 5 fathoms sand, but from the latter depth the decrease is regular to 4 fathoms about a mile off shore.

The W. channel is very wide, but the W. side of Angaum must have a berth of 1 m., as you shoal from 6 fathoms mud to 2 fathoms rock at a cast, within ¼ m. of the shore. This island may be approached to ¼ m. at the N. extreme, in rounding which it may be approached within 200 yards with safety. The large bay to the N.W. of Angaum, called Deristan Bay, being exposed to sea-winds, is unfavourable for anchorage, but the 6-fathoms flat, that extends from the W. side of Angaum towards El-Kishm, may probably break the force of the sea; or, on the appearance of a S.W. gale, a ship at anchor might slip her cable and run into the Sound.

Seen from the S., there is nothing to indicate Henjam Island, but the dark colour of most of its hills, compared with those on El-Kishm. Extensive garden-ground, and ruins of houses, here, and in other parts of the Island, indicate its once flourishing state; and near the White Mosque at the N. point of the Island, are the remains of a considerable town, with eighteen tanks or reservoirs for holding water. About half of them are still arched over, and lined with brick; but they are much filled up with clay and sand.

S. coast of El-Kishm. Diristan is a village at the bottom of the bay to N. of Henjam Island; to the W. of it the hills are pretty high and culminate at 20 m. to the W. of Ras Kharguh, in a peak, 1,300 ft. above sea, called **Kishkoh**, the highest hill on the Island.

Proceeding from Angaum to the W., the soundings are regular towards Kishm, until the bank, called **Basiduh Flat**, is approached, which is steep to, having 25 or 30 fathoms near its S. extremity, where the depths on it are only 2 and 3 fathoms in lat. 26° 24½' N.: *white water* extends about 3 m. farther out. This bank, which should not be borrowed on under 8 fathoms, is an excellent mark in the night or in thick weather to point out a ship's position when passing between the S.W. extremity of El-Kishm and the Great Tumb. The E. extreme of Basiduh Flat bears about S. from Kishkoh; here it is about 6 m. from the island, leaving a fair channel between.

Dustacoon Point, the S.W. Point of Kishm, in lat. 26° 31½' N., lon. 55° 17' E., is fronted 8 m. by the extensive Basiduh Flat already mentioned, 3 leagues off shore. Dustacoon Point is clear of dangers, and the channel between it and Basiduh Flat is 1 m. wide.

BASIDUH, or BASSADORE POINT, the N.W. extremity of El-Kishm Island, is in lat. 26° 39' N., lon. 55° 16' E. A short distance within the Point stand the ruins of the once flourishing Portuguese town of Bassadore. At this place there is an excellent harbour, but the approach to it is shoal, and ships of the largest class could only enter towards H. W. Ships should work between the sands, to 8 fathoms toward the South Sands, and 5 fathoms toward the North. The channel in general is about 2 m. wide, and the tide strong; it is therefore useless to attempt to work against it, either going in or out.

Basiduh is a small village on the N.W. point of El-Kishm Island, and the dépôt of the squadron stationed in the Gulf. The point is of low cliff, 20 ft. above H. W., and level on top, with a few small buildings scattered about, and some date-trees. The Government buildings are: a hospital for invalid seamen, a small store-house containing some ship's stores, a cooper's shed, a forge, and a house for a small guard of Sepoys stationed here. There are also three water reservoirs; a jetty, extending only to L. W. mark; and a store of coal, lying in the open air, and covered with a layer of mud laid over mats, which, in this dry climate, is found an efficient way of preserving it from the disintegrating effect of the sun and air. The remainder of the village consists of two or three houses built by officers of the squadron, one of which, $\frac{1}{2}$ m. to S. of the point, has a **flag-staff**, on which the union jack is hoisted when any ships are in the roads, and is the first thing seen from seaward; a small **bazaar** for the supply of bum-boat stores to the seamen; the house of the Persian merchant who supplies the vessels with provisions, which is the best building in the place; and a scattered village of donkey-owners, washermen, &c., who depend for their living on casual visits of the vessels of war. The merchant supplies the ships with all necessaries, except salt meat and spirits, at a certain fixed rate. Good water is obtainable only in limited quantities; when the three government reservoirs are empty, it has to be brought from Nakhlestan, and a ship would save time by going to Lingeh, or some other port on the main, to fill up. There were always a few hundred tons of coal here belonging to the Indian government, brought at great cost from Bombay; but a better supply may be found now.

The Hummocks, are three remarkable hills to the S.E. of Basiduh, and to N.E. of Ras Dustakun, useful as land-marks when entering Basiduh roads. The W. hummock, 2 m. N. $\frac{1}{2}$ E. from the Ras, is table-topped, and the lowest of the three. The centre, which bears N.E. by E., at $\frac{2}{3}$ m. from the W., has a rounded top. The E. and highest, is 585 ft. high, and bears about E. N.E. $1\frac{1}{4}$ m. from the W.; it is table-topped, has a little bush on the top, and may be seen 25 m. All three are quite precipitous on the S. face, and the E. is nearly joined to a long range of table-land, a little lower than the hummock, which extends 4 m. to the E. by N., with a precipitous S. face, and ends in a bluff. At 2 m. E. by N. from this bluff is a table-hill or hummock 550 ft. high, standing in the plain N. of Kauni Village, and to the E. of this are ranges of lower hills extending as far as the salt hills. Kishkoh (1,300 ft.), the highest hill on El-Kishm, stands about $1\frac{1}{2}$ m. to E.N.E. of the hummocks.

Tides. The rise and fall at springs is 10 ft.; at neaps 2 to 4 ft.; H. W. at F. and C. at 12 h. The tide-stream entering Clarence Strait by Hormuz, and setting W. through the Strait, reaches here about 1 h. to $1\frac{1}{4}$ h. before H. W.; and the East-going stream, the same time before L. W.; this latter has always been called the flood. The set of the tides between the point and flat is not sufficiently made out. On the Basiduh flat, clear of the island, the ebb-tide sets E.N.E. and the flood W.S.W., and the stream runs three hours each way after the turn of tide, so that it appears to make at half-tide, as shown by a gauge. The tides run 1 to 2 knots an hour, and in some parts of the channel even more.

At the Persian Gulf entrance, the peculiarity of the tide-stream is very marked, the stream running on three hours each way after turn of the tide, as shown by the gauge. This is always more or less the case where the tide has to enter a basin through a narrow entrance. The stream of flood sets up N. towards the Persian coast, and to the W. along both sides of Larek, Hormuz, and El-Kishm, at a rate of 2 to 3 knots an hour; also past the Quoins to the W., and then to the S.W., along the coast of Ohman, but weaker, being 1 to 2 knots per hour. At the islands called Tumb, the stream runs 3 knots on the springs, nearly E. and W., and here also runs three hours after H. W. The ebb everywhere appears to run in about the opposite direction to the flood.

In its progress through the Clarence Strait to the N. of El-Kishm, the tide-stream is so much retarded, that it does not arrive at Basiduh till one hour before H. W., so that it has always been considered to be the *stream of ebb*; it being said that the flood-tide set in at both ends of the Strait, meeting somewhere at Left; which is certainly not the case; but it is apparent that the creeks and channels between Basiduh and Goran, and the swamps on the Persian coast to the N.W. of Kishkoh, are first supplied by the E.-going stream, which runs through Basiduh anchorage till the last-quarter-flood as shown on the tide-gauge. Then the proper flood, or W.-going stream arrives through the Strait. The entrance to Basiduh being from the W., and the in-going current corresponding so nearly with the time of the rising tide, it is called the flood.

The tide runs also strong through the chain of islands S. of Ras Bostaneh, owing to the contraction of the water-way by them, and the projecting cape. At Kais it is much weaker, 1 to 2 knots; the stream still being three hours behind the tide.

The Roads.—Beacon Shoal. Five-eighths of a mile W. $\frac{1}{4}$ N. from the point is a beacon, consisting of a ship's mast with a cask on it, about 40 ft. high, and visible 6 m., on the N. end of a

long narrow shoal, which runs to S.W. by S., $3\frac{1}{4}$ m., and is rocky near the beacon end, the rest being a sandy spit. It is dry at L. W. for 3 m. from the beacon, and thence deepens off gradually in a tail, bending round S. and S.S.E. This shoal forms the shelter to the anchorage against the shemal, which here blows at S.W. by W. There is a narrow deep channel between the Beacon Shoal and a mud flat extending off the W. side of the island, but not navigable. The Beacon Shoal is deep-to, having 8 to 10 fathoms, the deepest water in the channel, close to its edge.

Anchorage. Parallel to Basiduh Point, and rather less than $\frac{1}{2}$ m. off it, is a deep gut, with 15 to 16 fathoms in it, which ships should avoid anchoring in. The anchorage is on the belt between this and the point; the available breadth of anchorage-ground being under $\frac{1}{2}$ m., between the gut and the 3-fathom line. The best anchorage is immediately after crossing the gut, in 7 to 5 fathoms at L. W.; and either opposite the jetty, or thence as far as the store-house, and $\frac{1}{2}$ to $\frac{3}{4}$ m. off shore. The bottom is clay, very good holding-ground. The E.I.C. sloop *Elphinstone*, upon one occasion, could only weigh anchor by heaving down her bow at L. W., and securely stoppering the cable. It is advisable to moor, as the winds blow strong against the tides, and a vessel is apt to foul her anchor, or, at any rate, lies very uneasily: open hawse should be to S.

DIRECTIONS for entering and leaving Basiduh roads. In the morning a vessel will generally have to work in, often against a fresh land-wind: in the afternoon the sea-breeze generally blows about S.W.; a most refreshing breeze in the hot season.

A vessel, coming from the S. or E., should stand or work along the edge of the flat, being guided by the lead, which must be kept going quickly, and she must keep in 10 fathoms till Great Tumb Island, highest part, bears S.S.E.; by day-light the discoloured water is a good guide. A vessel not drawing more than 12 ft. water may stand anywhere over the flat, the bottom being soft. By night she would sight the Tumb, which would be best done by steering to pass a mile or two N. of it, as it would then not be seen more than 2 to 3 m., owing to its brown colour and level outline: the soundings are little guide approaching the island, which is deep-to, especially on the N. side. The tides run with great strength, at, and between the Great Tumb and the Basiduh flat; setting E. and W. 2 to 3 knots at springs. A stranger had probably best anchor on the edge of the flat, and wait for day-light.

As a rule, it is not advisable to stand between the Tumbs by night, as the tides set strong, E. and W., between them.

When the Tumb bears S.S.E., it should be kept on that bearing while in sight, steering a little to either side of N.N.W., according to the tide: the island will be seen 14 to 15 m., or until the Hummocks on El-Kishm Island bear N.E., when you will be well on the flat, in $3\frac{1}{4}$ to 4 fathoms, L. W. If you shoal to 3 fathoms, a course more to the W. should be steered, until the water deepens. Vessels standing over the flat, particularly at night, should keep a good look-out for fishing-boats at anchor, near its outer edge. The surveying-vessel, *Marie*, on one occasion, passed, at night, about a dozen lying at anchor off Lingeh, in 17 to 20 fathoms, with their masts down; so that even by day they are not seen till close-to.

Grubb's Notch, on Persian coast, if visible, is a useful mark: by keeping it N.N.W., after the Tumb is out of sight, you be clear of the W. edge of the shoal part of the flat. After shoaling on the edge of the flat, the soundings will be $3\frac{1}{4}$ to 4 fathoms at L. W. When the Hummocks bear E. by N., Basiduh Point will be sighted, about 8 m. distant, and should bear N.E.; you may then steer N.E. by N., keeping a good look-out for the beacon, on the Beacon Shoal, or S. bank, which does not show very well until brought clear of the mountains, and is visible 6 m. by day.

When the Hummocks bear E., you are clear of the shoal part of the flat, and will have the beacon and buildings on Basidah well in sight. When bearing from E.N.E. to E.S.E., the Hummocks do not show well, being nearly in one: the bearing of the highest part of the table-land may be taken. When the flag-staff bears N.E. by E., you are in the **Fairway**. Then stand or work up the channel between the N. and S. banks; the course is about N.E. by N., with the beacon well open on the starboard-bow. The S. bank, or Beacon Shoal, is steep-to: and at 2 and 3 m. to S.W. of the beacon, 10 fathoms, the deepest water in the channel, is very close; so that it is advisable to tack in the deep water in that part, or to haul more to N., if running in. Near the beacon there is deep water also, so that here the deep water is not a warning of approach to the danger. At half-tide the S. bank shows well, either by breakers on it, or, with a sea-breeze, by the smooth water inside it. The beacon bearing N.E. will clear this bank: or beacon open to the right of the Khamir mountains, if seen, will keep a vessel in the fair way and clear of the S. bank until tolerably near the beacon.

You may be guided in your approach to the N. bank by the lead, tacking when you shoal the water. Beware, if working in, of standing across the S.W. tip of it, towards the main; as, on the opposite tack, you might not have water enough to re-cross it. A steamer or sailing-vessel,

running in and out with a fair wind, is apt to find herself unexpectedly on one side or other of the channel, from the tide catching her on either bow.

The beacon may be rounded at any distance, from half a cable, or even less, if a strong in-going tide, and light air, and a vessel should be prepared to anchor immediately after shoaling inside the gut. A *running moor* is here conveniently made.

Coming from the W. Take a departure from Lingeh, and steer a course for Basiduh Point, which should bear, when sighted, from E.N.E. to N.E. by E. If working up from Lingeh, you may stand well over to the Persian shore, till the point is sighted, taking care to tack on deepening your water, which you will do near the shore-reef. The water is very shallow for half the distance from the Basiduh Flat towards Lingeh. The tide setting somewhat across the course, renders attention necessary: if an in-going tide, you may get set to N. between the N. bank and the main; or, if an out-going tide, to the S., towards the S. end of the beacon shoal. Either of these is of common occurrence by night. In other respects the directions above given may be followed.

By Night a stranger, or vessel of large draught, had best anchor on the flat, and wait till daylight. A vessel drawing 16 to 17 ft. might go in, particularly on a moon-light night, by feeling her way round the edge of the flat; or, if coming from the W., by taking a departure from the Lingeh coast, and steering for the point. A fire would be made on the point, in answer to Blue lights from the ship, if seen. It would be advisable to keep along the N. bank by the lead, till opposite the place, and she should avoid getting on the wrong side of the N. bank.

JEZIRAT TANB, called by seamen, the **Great Tumb**, 165 ft. high, in lat. $26^{\circ} 15' N.$, lon. $55^{\circ} 20' E.$, bears about S. 24 m. from Bassadore Point, and is a low, level island, $2\frac{1}{2}$ m. long, with some trees on it, and may be seen about 5 or 6 leagues from the deck of a large ship. It may be approached within $\frac{1}{2}$ or $\frac{1}{4}$ m., and tolerable anchorage found under it during a N.-Wester. A bank projects $1\frac{1}{2}$ m. to the S., not dangerous, as there is not less than 7 or 8 fathoms on it, except near the shore. Off the S.W. point, about a mile distant, a shoal of 9 ft. is reported to exist. The S. side of the Basiduh Flat lies only 8 m. to the N. of the Great Tumb, so this island is a most valuable land-mark.

Nabyu Tanb. or Little Tumb, 116 ft. high, in lat. $26^{\circ} 15' N.$, lon. $55^{\circ} 10' E.$, distant $6\frac{1}{2}$ m. W. $\frac{1}{2}$ S. from the Great Tumb, is barren, and not so regular in appearance as the other, and, like it, uninhabited. This island seems to be clear of danger; it lies 23 m. off the Persian coast. The depths to the N. of it are 40 to 50 fathoms; but the bank, with 20 fathoms, is only 7 m. from it, and thence the soundings decrease gradually towards Lingeh.

ABU MUSA, or Bu-Moosa Island, (the peak) in lat. $25^{\circ} 53' N.$, lon. $55^{\circ} 3' E.$, distant 7 leagues to the S. by W. $\frac{1}{2}$ W. of the Little Tumb, and $11\frac{1}{2}$ leagues about N.W. by N. from Shargh, is an uninhabited Island, $2\frac{1}{2}$ m. long, conspicuous by a high round hill near its centre, 360 ft. high, with several small hummocks at the E. end. There is deep water near it all round; but anchorage is bad; the best is off the S.E. corner.

SIRRY, SERI, or SURDY ISLAND, in lat. $25^{\circ} 56' N.$, lon. $54^{\circ} 33\frac{1}{4}' E.$ (N.E. point), $8\frac{1}{2}$ leagues to the W. of Bu Moosa, and $6\frac{1}{2}$ leagues to the S. of Polior, or Faroor Island. It is of triangular form, and $2\frac{1}{2}$ to 3 m. in extent. From the W. side of the Island foul ground projects 1 m., also from the N.E. and S.W. side; but on the S. side of the Island, though the bottom is rocky and bad holding-ground, there is anchorage, about 4 cables off shore in 7 or 8 fathoms, with shelter from both shemal and nashi, and where water and refreshments, it is said, may be obtained at moderate prices: the N.W. side also affords water. There is a small village near the N.E. corner, inhabited by about twenty families from Lingeh. There are three or four hills on the Island, two of them near each other: and near the highest of these hills, 50 ft. high, stands a mosque or white pagoda.

Seir Abu Nufair, or Abu Neir Island lies about 40 m. to S.S.W. of Sirry. (See page 248.)

NABYU FAROOR, or NOBFLEUR ISLAND, in lat. $26^{\circ} 7' N.$, lon. $54^{\circ} 27' E.$, bearing about S.S.W. from Faroor, or Polior, distant 8 m., has a hill near the E. end 120 ft. high, which in most views forms a saddle, and may be seen 6 leagues from the deck; but the other parts of the Island are low. It may be approached within the distance of $1\frac{1}{2}$ or 2 m. all round; the depths are pretty regular towards it, and there are 40 fathoms mud about 2 m. off; but a ledge of rocks above water is said to project from the N.W. end. In the channels among these islands, also betwixt them and the Tumbs, and to the S. of them, the usual depths are from 40 to 50 fathoms, decreasing towards the Arabian coast.

JEZIRAT FAROOR, or POLIOR, lat. of centre $26^{\circ} 17' N.$, lon. $54^{\circ} 31\frac{1}{2}' E.$, 465 ft. high, is an uninhabited island situated 14 m. to the S.S.W. of Ras Bistānah; it is 4 m. long from N.N.W. to S.S.E., and 3 m. broad, decreasing to the S. extremity, and may be seen 7 leagues. Three rocks above water lie about a cable's length off its S.W. end. Off the W. part foul ground extends

off shore a mile; but in all other parts the island seems steep, and may be approached within a cable's length on the E. side. A ship may lie completely sheltered from a N. Wester, by anchoring in 28 fathoms about $\frac{1}{2}$ m. from the shore, with the extremes of the island from S.W. $\frac{1}{2}$ W. to N., and Nobfleur S.W. $\frac{1}{2}$ S. On the N. side of the Island there are 40 fathoms within $\frac{1}{2}$ m. of the shore. The *Prince of Wales* found various depths in passing along the W. side of the island at $\frac{1}{2}$ m. to $1\frac{1}{2}$ m. distant, from 7 fathoms rocks to 25 fathoms no ground; and no danger was perceived, excepting the three rocks above water, mentioned above. In some parts the bottom was from 8 to 10 fathoms sand, about $\frac{1}{2}$ m. off shore; and off the N. end of the island 10 fathoms were found within $\frac{1}{2}$ m. of the shore. The fair passage, between it and Polior shoal, is 5 m. wide.

Polior Shoal, or Najweh-el-Faroor, least water 15 ft. lies midway between Faroor and the coast, or 7 m. to N. by E. of that Island. From the shoal, Jebel Bistánah bears N.E. $\frac{1}{2}$ E.; so it is a good rule, when near the shoal, not to bring that peak to bear between N.E. by E. and N.E. $\frac{1}{2}$ N. Similarly, the highest part of Faroor should not be brought between S. and S.S.W.

With a turning wind, the channel between Polior and the main should be chosen, which is wide; but a ship drawing above 12 or 13 ft. water must be careful to avoid Polior Shoal; and if irregular hard soundings are got on the edge of it, she ought to haul off from it immediately. But with a Southerly, or steady fair wind, when abreast of the little Tumb, steer W. about 20 m., then W. $\frac{1}{2}$ S. for Polior, observing to pass between it and Nobfleur nearly in mid-channel, or rather near the former; a good look-out is proper in the night, when running between these islands, as the water is deep and not fit for anchorage, and the soundings are no guide in approaching them, except very close to the shore. A ship having passed to the S. of Polior with a fair wind, a course steered W.N.W. 8 or 9 leagues will bring her near the Island **Kais**, or **Gais**, in regular soundings; when this island bears N. by W., or in the night, she should not come under 30 fathoms, towards it, for from 17 fathoms the water shoals suddenly to 7 fathoms, rocky bottom, on a reef that projects 1 m. from the S. part of the island.

KAIS ISLAND, called also **Gais**, or **Kenn** (the **Kisi** of Marco Polo), having its E. point in lat. $26^{\circ} 29\frac{1}{2}'$ N., lon. $54^{\circ} 3'$ E., is fruitful, well inhabited, and better planted with trees than any island in the Gulf; it is low, not to be seen above 4 leagues, not exceeding in any part 120 ft. high, and is 7 or 8 m. in length, W.N.W. and E.S.E., and 4 m. in breadth. The Island is safe to approach by the soundings, where there is anchorage, in case of necessity, at the E., W., or N. sides of it; but 9 or 10 fathoms is sufficiently near for any vessel, as from these depths the water shoals suddenly on the bank that lines the N. side of the Island, about a mile off shore. Between it and the main, the channel is about 2 leagues wide, with 26 to 30 fathoms in the middle, decreasing regularly toward the coast; but it shoals quickly when near the Island, from 24 to 12 and 14 fathoms sandy bottom; then to 10 fathoms about a mile off. Jebel Taranji, or Chárek Hill, a remarkable mountain on the main, elevated 5,100 ft., bears N.N.E. when on with the W. point of the Island, and is a good mark for it. If, passing in the night between the Island and the main, you shoal fast toward the former, tack or haul off from it, and when the soundings are 20 and 25 fathoms regular, you will be in a fair track.

Mashi Village, at the N.E. point of the Island, contains about 500 men, chiefly employed in the pearl fishery; they have 50 boats, and are under the Sheikh of Chárek. The ancient Mohamedan town of Harira (Kis), shows its ruins between 2 and 3 m. to the W. of Máshi, extending for $\frac{1}{2}$ m. along the shore. This city, which flourished in the 12th century, was the great depôt of trade with India and China, before Hormuz rose into importance; it is marked by mounds with tottering masses of masonry here and there, and quantities of broken pottery scattered about; to the S. of the town are several ruined water reservoirs.

The best Anchorage is off Mashi Point. In the summer, when E. winds are not experienced, a vessel should anchor in 6 to 8 fathoms, mud, in Mashi Bay, with the square forts bearing W. by S., quite sheltered against the Shemal: but in winter, if an E. gale comes on, she would have to ride it out in a heavy sea. E. I. C. sloop-of-war *Clive*, riding out a Nashi, in company with the surveying brig *Euphrates*, in January 1858, parted her two bower cables. In February 1820, the expeditionary fleet, consisting of 7 men-of-war and 14 transports, was caught in one of these gales at this anchorage, and the *Mercury* cruiser parted one bower cable; the damage sustained by the other ships is not known. In the winter a vessel had better anchor in 10 fathoms mud, with Mashi forts bearing S., about $\frac{1}{2}$ m. off shore, when she would be partly sheltered from the Shemal, (which here blows from W. to W. by N.), by the reef off Harira, and would be able to weigh if an Easterly gale come on. The anchorage off Harira, open to the prevailing winds, is in 8 fathoms, $1\frac{1}{2}$ m. off shore.

Directions. As the island is difficult to see at night, great caution is required while passing it outside, 40 fathoms being within 3 m. E.I.C. schooner *Emily* was lost by running on the W.

point of this island at night, in 1845; the ship *Ambassador*, was lost on the beach in Mashi Bay, in December 1857, when running before an E. gale on a dark night. On the N. side, the lead is a better guide, but must be kept going quickly. The greatest depth in the strait is 36 fathoms, about mid-channel. If working through, you must tack on the main by the eye, as the deep water is carried close in to the shore, which is clear of danger; on the island side you may tack in 12 or 13 fathoms. It is not recommended to pass through the strait by night, unless the island can be seen.

Tides. It is H. W. on F. and C., at Mashi at 12 h. 45 m.; rise and fall $7\frac{1}{2}$ ft. The tides set strong through the strait, but are very weak in the deep water outside the island.

Five Fathoms Shoal, called **Sameroon**, of coral rock and sand, about 2 m. in extent, bears W. by N. 9 m. from the W. end of Kais. The depths on it are from 5 to 7 fathoms, and there are from 18 to 30 fathoms water near to its edge. When the *Mornington* was upon the shoalest part, Charak Hill bore N.E. $\frac{1}{2}$ N. and the W. end of the Island Hinderabi was N.W.

HINDERABI, or **Inderabia Island**, centre in lat. $26^{\circ} 40\frac{1}{2}'$ N., lon. $53^{\circ} 37\frac{1}{2}'$ E., is low and level, 100 ft. in the highest part, and is 4 m. in extent E. and W. The channel between it and Cheroo point on the main land is nearly 2 m. wide, with soundings of from 7 to 12 and 19 fathoms mud; it is quite safe, by giving a berth to the shoal spit fronting Cheroo Point. In a S.-Easter or a S.-Wester, a vessel might anchor in 7 fathoms, off the village on the N. side of the island; if a Shemal came on, she could run to the E. of the island or to Cheroo Bay.

SHEIKH SHUAIB,* or **Busheab Island**, in lat. $26^{\circ} 47'$ N., lon. $53^{\circ} 29'$ E. (the E. extremity), extends W. by N. and E. by S., $13\frac{1}{2}$ m. and is 120 ft. high, and level, with groves of date-trees, particularly on the side next the main; it is inhabited. The channel between it and the main is about 5 m. wide at the E. entrance, and about 9 m. wide in the middle, the usual depths from 16 to 24 fathoms. The E. entrance is contracted by a rocky spit that projects 2 m. in a N.E. direction, from the E. end of the island, having a passage of 3, 4, and 5 fathoms between it and the Island Shitwar. The island on both sides is lined by a shoal bank, which projects $\frac{1}{2}$ m., having 4 and 3 fathom rocks upon it, near the middle of the S. side of the island, and 23 fathoms mud near its edge, not above a mile off shore. A rocky shoal surrounds the W. end of the island having 2 to 4 fathoms water on it, about $1\frac{1}{2}$ m. off the W. end of the island, and there are 24, 20, and 18 fathoms close to its outer edge, at the W. and S.W. parts. This reef is dangerous to approach in the night; one of the packets ran upon this island in the night and was wrecked. At the E. end of the island there is good anchorage in 5 or 6 fathoms, where fresh water may be got, but the Sheikh some years ago was a predatory chief, not to be trusted. The island is commonly called by Arabs, **Jezirat-es-Sheikh**.

Shitwar Islet, is a low, small island, separated from the E. end of Sheikh Shuaib by a channel about $\frac{1}{2}$ m. wide, in which there are 3 to 5 fathoms water; but a spit that projects from the S.E. end of Sheikh Shuaib, at the extremity of which there are only 2 or 3 fathoms, contracts the channel here to $\frac{1}{2}$ m., which has only 3 fathoms water in this part. The best track is about a third over from Shitwar, but this passage is too contracted for large ships. The channel between Shitwar and Nakiluh Point, on the main, has depths from 12 to 17 or 18 fathoms, decreasing towards the point to 4 or 5 fathoms near the shore; it is 5 m. wide and very safe

CLARENCE STRAIT AND PERSIAN COAST.

Clarence Strait is the name given by Captain Brucks to the passage between El-Kishm Island and the main, which is navigable for ships, but very intricate; the survey of it is incomplete.

Directions. It would not be prudent to attempt the passage through Clarence Strait without a pilot, as the tides run strong; the large scale survey not being sufficiently correct to navigate by. There are professional pilots for the Strait, who reside at Kesm, and would have to be sent for, if starting from Basiduh; they may be trusted entirely with the navigation of the ship. Working through must be done by tide work, anchoring as soon as the stream turns against you.

Leaving Kesm, the channel is about 2 leagues broad till you are 20 m. to the W. of Hormuz Island; then comes the **Middle Shoal**, which extends for 8 m. to the S.W., with others beyond, and it is usual to work along the island side, which requires great care. The channel is under a mile in width, and the pilots tack in 11 fathoms on either side, the water being deeper than shown on Captain Brucks' chart: they say a quick-working vessel might tack in 10 fathoms on the S.

* The dangerous Shah Allum Shoal of 6 to 15 ft., surrounded by 2 and 3 fathoms, lies S.W. by W. 14 leagues from the W. end of Busheab Island; or in lat. $26^{\circ} 25\frac{1}{2}'$ N., lon. $52^{\circ} 31'$ E. (See page 249.) The discovery of this sunken danger and of the Rennie Shoal (about 15 leagues to N. by E. of Bahrain) should warn navigators to keep the lead always going in these waters.

and 8 fathoms on the N. bank, which would be very close. As far as Laft Point the passage is clear of danger; but the bottom is rocky, and bad for anchorage. After passing that point it is generally mud. Working through to the W., with a W. wind and flood-tide, is much less dangerous than running through with an E. wind. With a fair wind, a contrary tide is best.

After passing Laft Point, **Khor Guran**, the E. one of the two navigable channels, is the passage generally used by the pilots; indeed there are few of them will undertake the W. passage. In Khor Guran the banks are everywhere a guide, either in sailing or working: in the first reach below Laft, the pilots tack in shoal water on the W., and deep water on the E. side. In the narrow part thence to Guran (a small village about 5 m. to the N. of Kishkoh), the vessel has to put about again as soon as she has gathered headway. The only difficulty appears to be at the entrance, W. of Guran, where the banks of the Khor are under water. You may then keep along the shore of the island at about $\frac{1}{2}$ m. off, as far as Diraku village, when it is usual, with Kishkoh bearing E. by S., to cross over to the N. bank, and run along it in 5 fathoms, till past the detached 9 ft. **Shoal Bank** lying off the island between that place and Basiduh, when you may stand across for the anchorage, with the beacon bearing to S. of W.S.W.; and be careful how the tide sets you.

The Coast of Persia, from Bunder Abbas, takes an average direction of W.S.W. for 40 m. to **Khamir**, a fort and town on the main land, 7 m. to the W. of Laft Point. It has a large fort, with a high square tower in the middle: the town, which contains about 200 men, is without the walls, and has a date grove to the E. of it: the foot of the range of mountains behind this place is about a mile distant. The town lies $\frac{1}{2}$ m. from the shore, or port, where there is a small building for storing the sulphur exported from this place. The port is approached by a small creek, admitting boats of 20 to 30 tons only, which take the sulphur hence to Bandar 'Abbas. Millstones also are exported from this place. There is a small Arab garrison here belonging to the Maskat government. The sulphur mines are in hills at the foot of the mountains, 3 to 4 m. W. of the place, and are very productive; they are, of course, worked very rudely, but would afford a very large supply if there were a demand for it, and they were properly conducted. It is a monopoly of the Sheikh of Bandar 'Abbas; 100 to 150 men are employed, and the monthly export is about 15 tons. They have been worked for a very long time. The coast line runs to W. and S.W. from this place to the mountains opposite Basiduh; it has not been traced, and is fronted by extensive mangrove swamps, intersected by numerous creeks.

Mountains. The great chain of mountains of which **Jebel Genao**, or **Ginnoh**, forms the E. part, trends to W. and W. by N. into the interior. At 18 m. W.S.W. from Genao, there is a remarkable mountain, 5,120 ft. high, with two great steps or notches on its W. side; and W. of Genao 55 m., is a high peak on the same range, visible over the other mountains far out at sea, and even off Ras-el-Kheimh: this peak is 9,200 ft. high, and has snow on it in winter.

Khamir Peak, the E. peak of another range bears N.E. 8 m. from Khamir town; the range begins about 5 m. to the E. of it, there being a great valley between it and the hills which come from Bunder Abbas. Khamir Peak has a small peak on the highest part, and is 3,700 ft. high: 13 m. W. of it, on the same range, is another peak much higher, but not very conspicuous in shape. From it a great branch or spur of the chain runs S.E.; at the foot of which, 4 m. W. of the town of Khamir, are the sulphur-hills.

The **Linjah** range commences at 10 m. to N.N.E. of Basiduh Point, and continues in a W. direction, apparently uninterruptedly, for a great distance. The summit of the range opposite Basiduh is 2,940 ft. high, and of rounded or convex outline. There is a great valley between this and the Khamir range, the coast at the mouth of it being low and swampy. **Grubb's Notch**, at $17\frac{1}{2}$ m. N.W. $\frac{1}{2}$ W. of Basiduh, is a remarkable notch or saddle, between two little peaks, on the summit of the range; it is an useful land-mark when rounding the Basiduh Flat. To the S.W. of Grubb's Notch there is a detached mass of hills, some 900 ft. high, about 7 m. E. and W. by 4 m., with an extensive plain between it and the Grubb's Notch mountains. The mountain range continues to the W. from Grubb's Notch, and at $11\frac{1}{2}$ m., there is a small peak on the top of the range, elevated 3,900 ft., and conspicuous from the sea; it is called on the chart **Linjah Peak**. **Jebel Bostaneh** stands 8 leagues to N.W. of Grubb's Notch.

The Coast Line to the S.W. of Khamir is a swamp, with abundance of mangrove bushes which supply nearly the whole Gulf with fire-wood. To the N.W. of Basiduh, the strait is about 5 m. wide, but the navigable part has a breadth of only 2 m. There are two or three bunders not worth mentioning, to the N.E. of Linge, and the water is shoal all along this shore. **Kunk**, once a famous Portuguese town and factory, lies $8\frac{1}{2}$ m. to N.E. of Linge.

LINJAH, or **LINGEH**, also pronounced Linjeh or Linyeh, in lat. $26^{\circ} 38' N.$, lon. $54^{\circ} 54' E.$, one of the most flourishing towns on the Persian coast, is well built, and may contain about 10,000 inhabitants, chiefly of the Joasmi tribe. It has a nice appearance from the sea, having a

thick grove of date trees behind it, while the houses are of light colour; it shows best in the forenoon, when the sun shines on the houses. The highest buildings are two towers, a quarter of a mile apart; the western of which is 70 feet high, and may be seen 8 to 9 miles; on the E. tower, which is a little lower, and forms part of the Sheikh's house, the flag is shown. The town is partially defended on the land side by an insignificant wall with towers; outside the walls, behind the trees, are many domed water cisterns, some new and very large. A breakwater has been built in front of the town, enclosing a space of about 100 yards, in which boats lie, dry at low water, to repair, &c., and small ones to load and unload. Many baghalahs belong to this port, which trade to India, &c., and they send 50 boats to the pearl fishery. Baghalahs and other boats are built here. Good water is obtainable, also cattle, poultry, vegetables, rice, flour, &c.; fire-wood, but not enough for steam purposes. It is perhaps the best place in the Gulf to get any iron-work made, or repairs executed; but the workmanship is very rude. The chief of this place, who pays a tribute to the Persian government, has authority over all the places on the coast between Birket Sifteh (opposite Basiduh), and Bostāneh village, with the islands Seri, Nābyū Faroor, Tumbs, and Bu-Moosa. Kāleh Leshtan, a hill about 600 ft. high, covered with very ancient ruins and water-reservoirs, stands $4\frac{1}{2}$ m. to the N. by W. of Lingeh.

The Anchorage is in 5 fathoms, half a mile off shore, the holding-ground good, being clay bottom: it is sheltered from all winds except the Saheili, or S.-Wester, which, as at Kunk, sends a heavy sea into the roads; but the wind is always of short duration. Outside the anchorage is a khor, or belt of deeper water, with 7 and 8 fathoms, beyond which you shoal again to $5\frac{1}{2}$, and then deepen to 10 fathoms at 5 miles south of the town.

RAS AS SHENAS, the S.-most point of the Persian coast, is low and sandy, and bears W.S.W. about 7 m. from the anchorage off Linjah. Between these points is a deep bay, called Shenás Bay, with soundings of 6 fathoms and under, affording good anchorage sheltered from the Shemál, which here blows from the W.; in a Nashi also there is little sea, as it is broken by the Basiduh Flat, and El-Kishm Island. Ras as Shenás is quite free from danger, the soundings shoal gradually from 20 fathoms at 4 miles, to 10 at one mile distance, thence deepening again to 13 close to the point: this is the end of the *khor*, or singular deepening of the water close to the Persian coast, off Linjah and to the N.E. The tide runs strong round this point, causing a discoloration of the water, which has the appearance of a spit, although, as stated, the deep water is quite close to them. Ras-es-Shenas is in lat. $26^{\circ} 29' N.$, lon. $54^{\circ} 48' E.$

RAS BOSTANAH, sometimes called Ras es Shenás, in lat. $26^{\circ} 30' N.$, lon. $54^{\circ} 37' E.$, the first remarkable headland on the coast of Persia to the westward of El-Kishm, is a low sloping point with rugged hills behind it. Three miles inland to N.E. is the good land-mark **Jebel Bostanah**, 1,750 ft. high. Off this cape to S.S.W., are the shoals and islands of Polior (**Faroor**) and the island of Nobfleur (**Nabyu Faroor**).

Narweh-el-Faroor, or **Polior Shoal**, centre in lat. $26^{\circ} 28' N.$, lon. $54^{\circ} 33' E.$, lies between Polior Island and Cape Bostanah, within 5 miles on a S.W. bearing from the latter; it is composed of rocks, shells, and sand, and is $1\frac{1}{2}$ miles in diameter, with irregular depths on it from 6 to $2\frac{1}{2}$ fathoms. (See also page 265).

Ras Yarid is a low, broad cape, 13 m. to the W.N.W. of Ras Bostānah. At 2 m. within the Cape, stands **Jebel Yarid**, a dark hill, 1,200 ft. high, in lat. $26^{\circ} 38' N.$, lon. $54^{\circ} 26' E.$; it is visible 35 m. sometimes. A flat, with less than 3 fathoms, extends more than 1 m. off the point, with deep water close up to it. Duán and Moghu are two places in the bay between Bostānah and Yarid. **Moghu** (Mughuwah) has good anchorage in 6 fathoms, mud; this was for a short time the station of the Bombay marine squadron.

Charek Bay has regular soundings, all under 10 fathoms. Chárek town, at the bottom of the Bay, lies 10 m. to the N.W. of Ras Yarid. The chief of Chárek has under him the islands Kais and Sheikh Shuaib. Anchorage may be had off Chárek town in 4 or 5 fathoms, sheltered from the prevailing winds, but open to the S.W. An extensive low swampy plain stretches from this place to the S. of Linjah Peak and Grubb's Notch. **Tauneh Point** and village lie 5 m. to W.S.W. of Chárek; and thence the coast runs 14 m. to W. by N. with the mountains coming quite close down to the sea, to the little bay of **Jerzeh**, abreast of which, and 10 m. off, lies the island **El-Kais**. (See page 265). **Jebel Taranji**, or **Charek Hill**, 5,000 ft. high, is an excellent land-mark, bearing N.W. by N., 16 m. from Chárek, and 24 m. to the N.E. of Chiruh Bay.

Chiruh or **Cheroc Bay**, which is 30 m. to the W. of Chárek, is formed by a low sandy point, in lat. $26^{\circ} 42' N.$, lon. $53^{\circ} 43' E.$, which shelters the Bay from the Shemál, from which it is also protected by the island **Hinderabi**, the E. end of which bears W.S.W., 4 m. from Chiruh Point. The coast from this point goes nearly straight N.W. by N. for 14 m. to **Nakhiluh Point**. On the Chiruh ranges of hills, there is a table-top hummock, about 700 ft. high, bearing N. by E. from

the centre of Hinderabi Island. Some suppose Chiruh to be the once famous city Siráf, but Constable and Stiffe show cause for believing that Tahri is the site of that ancient place. From Chiruh Point, the islet **Shitwar**, off the E. end of Sheikh Shuaib, bears about W.N.W., 6 leagues. (See also page 266). **Samberoon shoal** (5 fathoms) lies $7\frac{1}{2}$ m. to S. of Chiruh Point.

Nakiluh is a town on the coast, opposite to Shitwar Islet and the E. end of Sheikh Shuaib; it is exposed to the Shemál. A bay, called **Bunder Bisiteen**, giving no shelter to ships in a Shemál, is formed by the coast to the N.W. of Nakiluh; it is 10 miles in extent, and has soundings in it from 5 to 18 fathoms. The coast from the W. point of this Bay continues in a N.W. by W. direction for 15 leagues to Ras Nabend.

Having passed between Polior and Nobfleur, and being 6 or 7 m. to the S. of Kais, a ship should steer N.W. by W. 10 leagues; the island Sheikh Shuaib will then be seen, and ought not to be approached on the S. side nearer than 40 fathoms, this depth being about 2 miles from the shore. Having passed Sheikh Shuaib on the S. side, at 3 or 4 leagues' distance, a N.W. course should be steered until soundings are obtained on Berdistan Shoal, which is an excellent guide. In working between Sheikh Shuaib and Ras Nabend, do not come under 30 fathoms in the night, for 25 fathoms is within a mile, and in some places half a mile, of the shore. In this space there is no shelter from the N.-Westers, nor any good anchorage.

RAS NABAND, or CAPE NABON, in lat. $27^{\circ} 23' N.$, lon. $52^{\circ} 35' E.$, slopes gradually in a low point to the N. from a piece of regular table-land; but a little to the S. it is uneven. Within 2 m. of the cape, the water shoals suddenly from 30 to 13 fathoms, and a shoal bank lines the N. side of it, extending into the deep bay formed on that side of the cape. In this bay there is good shelter from Southerly winds in 3 to 5 fathoms, but a 3 fathoms bank lies in the entrance near the N. shore, about 4 m. N.N.E. from Cape Náband, with 7 to 10 fathoms water in the passage between them; and 5 fathoms in the narrow passage between the 3-fathoms bank and the N. shore. About 3 m. inside of this cape lies Náband Town, on the S. side of the bay. **Siri Yefal Peak**, or **Asluh Notch**, 4,870 ft. high, looks down upon Naband Bay; it bears N. by E. 11 m. from Ras Náband.

Asluh, or Usailwah, is a town nearly opposite the N. low point of Náband Bay, to the N.W. of the river which falls into the bay. From this to Taurie, or Tahri, in lat. $27^{\circ} 40' N.$, the coast is nearly straight, and thence proceeds in a N.W. by W. direction for 6 leagues to Ras-el-Mara, near the town of Congoon; the coast then takes a direction nearly W. for 9 leagues, and then goes back to W.N.W. for 4 leagues to Ras Jabrin; but outside of this it is fronted by the islands and banks of (what seamen call) Cape Berdistan. The land round Congoon Bay is high, and this coast is well sheltered from N.-Westers by the foul ground to the W. of Cape Berdistan. Several villages are situated between Asluh and Congoon; the coast is safe to approach.

KANKAN, or CONGOON, in lat. $27^{\circ} 49\frac{1}{2}' N.$, lon. $52^{\circ} 34\frac{1}{2}' E.$, in the bay of this name, has good anchorage in $5\frac{1}{2}$ to 7 or 8 fathoms stiff mud, and shelter from N.-Westers. Behind the town the land is high and remarkable; the summit of one of the hills appears like a barn, and is called **Barn Hill**, or **Jebel Siri Ayenát**, 4,660 ft. high; it is a guide in rounding Berdistan Shoal, and stands 3 leagues nearly E. by S. from the town. About 3 leagues W. of Congoon, in lat. $27^{\circ} 49' N.$, there is a small projection forming the W. point of Congoon Bay; it is sometimes called Cape Berdistan, but the most projecting cape is $8\frac{1}{2}$ leagues W. of Congoon, and there are two islands to the W. of that. **Deyer Bay**, about 7 m. to the W. of Congoon, is a favourite place of shelter for baghalahs during the summer Shemáls; but in winter it is quite open to the Koss, or S.-Easter. From it the S.E. end of the Ras Mutáf Shoals bears S.W. distant 11 m.

Uhm-Kheileh, or Mokheileh, or Nikhailah, sometimes called Cape Berdistan, in lat. $27^{\circ} 50' N.$, lon. $51^{\circ} 28' E.$, is a small low islet, with two small date trees in centre, visible 6 or 7 m., and lying 6 m. off the main. To the N.W. of it lies Jabrin Island, or Uhm-el-Gassár, a thin strip of low sandy shore. To the S.E. for 18 m. stretches the great shoal called by seamen the Berdistan bank, and by Arabs Ras Mutáf. **Jebel Dreng**, or the **Hummocks of Kenn**, 3,270 ft. high, stands 5 leagues inland, bearing N.N.E., visible 15 leagues in clear weather.

RAS MUTAF, or BERDISTAN SHOAL, is very extensive, and the breakers on the foul ground lie in two ranges; one of these projects from the island of Mokheileh to the S.E. by E. about 6 leagues, between which and the inner range there is a space about $1\frac{1}{2}$ m. broad, where small vessels might anchor in 4 to 8 fathoms, stiff clay, and be sheltered from N.-Westers in case of necessity. The inner range of breakers extends along the coast $5\frac{1}{2}$ leagues to the E. from Mokhailah; and within 5 leagues of Congoon, where shelter from W. winds will be found by anchoring in 4 or 5 fathoms, under the E. end of these shoals, with **Jebel Dreng** bearing N.N.W., or open to the right of **Funnel Hill** (a peak which bears E. by N. 12 m. from Mokheileh); and, for a cross-bearing, **Jebel Siri Ayenát**, or **Barn Hill**, E. by N. $\frac{1}{2} N.$; from this place the soundings

decrease regularly in the W. part of the bay. In approaching this foul ground, the lead is a proper guide, as the depths decrease regularly to the edge of the shoal.

After passing Ras Nabend with a W. wind, a ship ought not to stand farther N. into the Bay of Congoon than lat. $27^{\circ} 35' N.$, or she may be obliged to haul to the W.S.W. or S.W. in rounding the foul ground of Berdistan. Several vessels after getting 30 fathoms in that bay, have afterwards steered out W. by S. and W.S.W., and shoaled from 25 fathoms to 10, 6, and 4 fathoms hard ground, on the bank, which ought to be approached by a stranger with caution, observing not to come under 10 fathoms in the day, nor under 13 fathoms in the night. With a working wind, a stretch in may be made during the day, when the bearings of the land are seen. Barn Hill should, be kept to the N. of E. by N. $\frac{1}{4}$ N. till the Hummocks of Kenn are bearing to the E. of N., in rounding the edge of the shoal. When these Hummocks bear N.E., a ship is clear to the N. of all danger on the foul ground of Berdistan. Except in the gap between the breakers, there is no shelter from the N.-Westers on any part of the bank, which may, when blowing hard, render it necessary to run to the S.E. round the breakers, and anchor under lee of them. Much ground is lost by running to the E. for shelter in Congoon Bay, and in getting out of the bay when the wind changes.

Tides. Off the reef to W. of Ras Mutaf there are regular tides, which run about 2 knots per h., W.N.W. and E.S.E., nearly in the direction of the coast. H. W. about 7 h. on F. and C. of moon; rise of tide 9 or 10 feet.

Ras-el-Khan, in lat. $28^{\circ} 2' N.$, is a low point of land to the N.W. of Ras Jabrin about 9 m. having a swamp or marsh within it. From this point Jebel Dreng bears about E. by N., and the coast, which is safe to approach, extends N.N.W. 18 leagues to Ras Halilah, the S.W. point of the Bushire peninsula, in lat. $28^{\circ} 50' N.$, lon. $50^{\circ} 53\frac{1}{2}' E.$ Exactly half way between Ras-el-Khán and Ras Halilah, a lofty range of hills (running nearly parallel with the coast, and only 4 m. inland), culminates in the two pinnacles called **Bu Beyyal**, or Ass' Ears, 2,500 ft. high; this is 12 leagues to S.E. by S. of Bushire Roads.

Halilah Bay, is formed on the S. side of the headland of this name, having Rahmah Tower on its E. side, 10 m. E.S.E. of the cape, and Halilah Peak, or Koh Khormuj, 6,500 ft. high, E. by S. $\frac{1}{4}$ S., about 10 leagues inland. In the Bay of Halilah, under the point, a small vessel may anchor, and obtain water more expeditiously, of better quality, and cheaper than at Bushire. **Koh Khormuj**, or **Halilah Hill**, is a long ridge, extending nearly N.N.W. and S.S.E., the peak or S. part being in lat. $28^{\circ} 42' N.$, lon. $51^{\circ} 29' E.$; another part, called the Paps, lies directly to the E. of Bushire; and the N. part of the ridge, or brow of the hill, called Gisakoon Bluff, is in lat. $29^{\circ} 19' N.$, lon. $51^{\circ} 21' E.$, and is 5,350 ft. high.

After the Hummocks of Kenn are brought to bear E. by S., the coast is clear of danger to Bushire, with regular soundings, and may then be approached into any depth at discretion, having good anchorage in 5 to 10 fathoms. After rounding Berdistan Shoal, not coming under 12 fathoms in the night, nor under 10 fathoms in the day, when the Hummocks of Kenn bear E. by S., and being in 14 or 15 fathoms, with a fair wind, steer N.N.W. $\frac{1}{4}$ W. 13 leagues, you will then be near Ras Halilah. In sailing along, from 20 to 25 fathoms are good depths until Bushire Point is approached within 4 leagues; then they begin gradually to decrease to 12 and 10 fathoms. It will be prudent, with a S.W. or Southerly wind, not to borrow under 12 fathoms in crossing Halilah Bay; but when the low point of Risheer is bearing about E. by N., the shore may be approached occasionally to 5 or $4\frac{1}{2}$ fathoms, until a ship anchor in Bushire Road. With the town bearing E. by N. the anchorage is very convenient, as a boat can then sail off and on, between the ship and town during a N.-Wester. Great attention to the lead is requisite in passing Bushire, as the low point of Ras-es Shat bears nearly W.N.W. from the town, distant 10 m., and is scarcely discernible, even in the day; a few shrubs or bushes are all that can be seen when in 3 fathoms, but the soundings decrease regularly towards the shore.

ABU-SHEHR, or **BUSHIRE**, in lat. $28^{\circ} 59' N.$, lon. $50^{\circ} 50' E.$ (British Residency flag-staff), is situated on the N. point of a low peninsula, of which Ras Halilah, $3\frac{1}{2}$ leagues to the S., forms the other extreme. The peninsula is a dry, sandy desert, subject to inundations by high tides near the town, and with a great dismal swamp to the E. of it, called Meshileh; but the town is tolerably supplied with fruits and vegetables in their season, brought from the inland country. The water is brackish, but said not to be unwholesome. Sheep, goats, and small bullocks are procurable, and fowls of excellent quality. This town was formerly fortified by a wall and towers, but is now in a ruinous state. Inside to the E. and N.E. of Bushire Point, is an extensive circular inlet or basin, which winds round to the E. of Maharag and Sheikh Saad Islands; the S. part is called Khor Lashkeri, that to the N. is Khor Bandargáh; its N. shore running in a W. direction towards Cape Ras-as-Shat, which is about 10 m. N.W. by W. of Bushire. This inlet is nearly

filled with sand-banks, some of which dry at low water: between these sand-banks are the navigable channels which form the inner anchorage of Bushire. Near the E. shore of the inlet is the long, low Island Sheikh Saad, and on the main land opposite its N. end is the town of Sheef. There is a narrow channel, having from 2 to 4 fathoms water, leading from Bushire Road round the N. end and inside the island. There is also a small island just inside Bushire Point, with a similar channel running along its S. side after passing Bushire.

A ship arriving off Bushire with a strong Southerly wind ought not to anchor in the outer road, where there is no shelter from such wind, and the extensive shoal, Ruggat-el-Ahli, between Ras-as-Shat (formerly called Columa Point), and the road, forms a lee shore. The N.-Westers blow directly into Bushire, and when the S. wind is strong, the N.-Wester may be expected with nearly double violence; it is therefore a bad road, with either of these winds.

Pilots.—When a vessel drawing less than 15 ft. arrives at this place, and intends to go into the inner road or harbour, the signal should be made for a pilot, who is sent out without delay. The charge for pilotage is $1\frac{1}{2}$ kerans per foot of draught.

Abu-shehr, always pronounced **Bu-shehr**, the principal sea-port of Persia, is a town with about 12,000 inhabitants, which is $1\frac{1}{2}$ m. in circumference, and poorly built, the only architectural feature being several high *badghirs*, or wind towers. The streets are narrow and dirty, and there is no attempt at draining, paving of any kind, or lighting. The British Residency is near the S.W. corner, with a flag-staff close to it, and the Persian governor's residence is a square fort at the S.E. corner, near the creek, at which is the Persian flag-staff. The highest part of the ground on which the town stands is a rocky ridge near the E. side, which does not exceed 40 ft. in height; a large *badghir* which stands on this, is the highest building in the town, and its top is elevated 90 ft. above mean sea level. This may be seen at a distance of 10 m., and, when coming from the northward, is visible before any other part of the town or low land.

Bu-shehr is directly under the Persian government, who keep a garrison of regular troops, called *Sarbáz*, and some field-pieces. The governor is called *Darya-Beg*, or Lord of the Sea, and is under the Prince of Fars. The amount of duties levied on exports and imports is variable, and sometimes certain articles are prohibited. On one occasion, when two or three ships had arrived to load with grain, of which there was plenty, the governor prohibited the export, on the plea that food was wanted in the country, thereby causing great loss to the shippers for demurrage; but it was intimated that if a certain sum was presented to the *Darya-Beg* the prohibition would be withdrawn. There was a terrible famine in Persia in 1871, 1872.

The population is chiefly a mixed race of Arab and Persian, that of the country round being almost exclusively Persian: about a hundred Armenian merchants are settled here. It is the station of the British Political Resident in the Persian Gulf, and the head-quarters of the Persian Gulf squadron. There is fortnightly steamer communication with Bombay.

A considerable trade is carried on with Basrah, India, Batavia, and the Mauritius: the traffic with the interior being by caravans of mules, which are the only animals capable of getting over the passes into the interior. The distance to Shiráz is about 180 m. The exports are corn, horses, carpets, dried fruits, rose water, and drugs. Imports are dates, piece goods, timber, sugar, indigo, iron, &c. About 12 large *baghalahs* which trade with India belong to this port, and many smaller coasting vessels. Part of the commerce is carried on by *baghalahs* from Koweit and other ports in the Gulf, and it is visited by a few European ships from Batavia, the Mauritius, and Calcutta. Supplies are easily obtainable at a reasonable rate, as cattle, vegetables, fruit, and other articles required for a ship, excepting salt meat. The drinking water used in the town is brought from wells, at a distance of one to three miles to the southward, the most distant being the best: the best water for ships is brought from Halileh Bay, but the boats are sometimes detained by *Shemáls* for one or two days. There is no fuel for steamers, and the supply of fire-wood is limited. Boats are not allowed to leave, or arrive at the town wharves, between sunset and daylight. The *Bu-shehr* boats fly a *Red* flag, with two-bladed sword in *White*, in the centre of the field.

The Outer Roads Anchorage is in 4 fathoms (L. W. depth), with the town E. by N. It is used by vessels of great draught, but is quite exposed, both to N.-Wester and S.-Easter. Boats can easily fetch off with the prevailing winds.

Khor Deiréh, by English seamen called the **Inner Roads**, (where, during the war, there were 40 to 50 large ships lying at one time), is the name given to that part where large vessels anchor: the soundings are 3 to 4 fathoms at L. W., over muddy bottom; it lies close outside the *Lakfeh Bank*, and with the town bearing from S.E. by E. to S. by E.; it is only half a mile wide, having on its N. side the shoal water extending off the dry banks of Ras-as-Shat. The deepest water is close to the *Lakfeh Bank*, a narrow sand-bank that dries at L. W. in an E. and W. line, and near which the lead is no guide. On the N. side the water shoals regularly but quickly; the banks

are hard sand, so that it is advisable to go about on getting a hard cast; or in a large ship to do so immediately the water shoals, and before getting a hard cast.

The Anchorage is the better sheltered in a Shemál the farther you go in to the E., and the easier it will be for boats to fetch the ship from the town. A large ship should anchor with the flag-staff S. by E. $\frac{1}{2}$ E. in 3 to 3 $\frac{1}{2}$ fathoms (L. W. depth), 2 $\frac{1}{2}$ m. from the town, and 3 cables from the edge of the Lakfeh Bank, so that she may have room to veer cable in a Shemál. A small vessel might bring the flag-staff S. $\frac{1}{2}$ E., and anchor in 2 $\frac{1}{2}$ fathoms, just outside the baghalahs, half a mile E. of the berth for large vessels, and opposite a small boat passage through the Lakfeh Bank, which is a very convenient berth. The holding-ground is everywhere very good in this anchorage, which has room for 30 or 40 ships.

Khor Sultani is the name given to a large creek with a shallow bar, by which boats of light draught run up to the wharves at the town. It passes close along the E. side of the town, where it is 2 cables broad, and has 4 to 6 fathoms, hard bottom; and thence runs to S.E., bending to E. between Maharag and Ras Fuder, and thence bifurcating to N.E. and to S.E.

Tides. It is H. W. at Bu-shehr, on F. and C. at about 7 $\frac{1}{2}$ h., the time being somewhat variable. The spring rise and fall varies from 6 to 8 ft. and the neaps rise from 4 to 6, their range being 2 to 4 ft. In summer the day tides, and in winter the night tides, are much the greater, the second tide being, in either case, quite insignificant. The winds affect the tide very much, the Shemal making it later, and lowering the general level of the water, while the Shurgi causes high tides, and prevents the water from ebbing. The July Spring tide is the highest in the year, which may be due to the S.W. monsoon heaping up the water in the Gulf.

In the offing, the stream which sets up and down the coast, is weak, and sometimes replaced by currents, of a $\frac{1}{2}$ m. to 1 m. per h., setting *with*, or perhaps *against*, the prevailing winds. In the entrance to Bushire Roads, the stream sets N. and S.; and, when near the inner bank, to E. across it into the creek, tending to set a vessel over to that side: and the ebb the reverse. In the anchorage it sets E. and W. along the Lakfeh Bank, and is weak on the shoal flats N. and E. of the anchorage. The tide is very strong in Khor Sultani opposite the town, as the sea-water floods and drains that immense marsh the Meshileh. The ebb sets to W. across and through the inner bank until that bank is dry, when it takes the direction of the channel; the last half of flood runs E. over the inner bank. The stream is also strong round the N. end of Sheikh Saad.

DIRECTIONS. The depths are given for L. W. springs. A pilot will always come off, weather permitting, if a vessel heave-to for him; do so in 3 $\frac{1}{2}$ or 4 fathoms with the Residency E. by N.; a vessel drawing more than 14 ft. would have to wait for the tide. The mud is so soft in the entrance channel, that a vessel would come to no harm if she touched the bottom in that part. When so far out that the low land is not seen, Gisakun Bluff, which bears N.E. $\frac{3}{4}$ E. from the town, will, in clear weather, enable a vessel to judge her position.

Coming from the S., if tolerably close in, the date groves in Halileh Bay will be the first objects seen; a ship may be kept in soundings of 5 to 7 fathoms till past Rishir, when the depth decreases, and she may keep in 3 $\frac{1}{2}$ to 3 fathoms, or a mile off shore, till opposite the tail of the outer bank, when the depths will decrease to 2 $\frac{1}{2}$ fathoms. By night she should endeavour to sight the land by keeping as close in as possible, paying great attention to the lead, so as not to run past the town, and get near the low point Ras-as-Shat. The town would be seen forming the termination of the land, appearing detached from the peninsula, and if any vessels were in the harbour, blue lights, &c., would be answered. At night, a stranger had best anchor in 4 to 5 fathoms, with the town bearing from E. to E. by S.

Coming from the N., a vessel would stand past Ras-as-Shat in 5 fathoms, being guided by the lead; when abreast of that point, which is not visible more than 3 m., the high badghir (wind tower) in the town would be sighted; she would then stand along the edge of the outer bank till opposite the town. There will always be a batch of shipping in the Inner Roads, whose masts may be seen far off, but should not be seen when bearing to the S. of a due E. direction.

Standing in from seaward, Imam Zadeh dome, at 5 m. to S. of Bushire, would be first seen (especially in the afternoon, showing white), when in 18 to 20 fathoms, the town not being seen till in 15 fathoms. The soundings are quite regular.

Entering the Harbour. Two buoys are at present maintained here by the British Government, one on the tail of the outer bank, the other off Ras-al-Marg, which is the W. extreme of the Lakfeh sand-bank that dries at L. W., and forms the S. boundary of the inner anchorage.

To enter the inner anchorage, pass close to the S. of the outer buoy, and then haul up N. $\frac{1}{2}$ E., passing a cable's length to W. of the inner buoy, and then stand for the shipping and anchor in 4 or 3 $\frac{1}{2}$ fathoms (L. W. depth), with Residency flag-staff about S. by E.

In case of the outer buoy getting adrift, there is no good cross-bearing to tell when you are

over the bank but Ras Shaghab date-trees point will then bear to the S. of S.S.E.; and the buoy off Ras-el-Marg about N.N.E., seen *under* the shipping in the inner anchorage.

The tail of Rugget-el-Ahli, the outer bank, should be crossed with the English Residency and Persian flag-staffs in one when bearing E. by N., for a large vessel. A small vessel coming from the N., may cross it with the Residency bearing E. to E. by S. By bringing the Residency E.N.E., or the N. end of the town on with the fall in the highest part of the Gisakun range, a vessel would get about a foot more water; but it is an advantage to cross as high up as possible, as it is the easier to fetch in with the prevailing winds; the bank, also, is more defined, and it is easier to make sure you have crossed it. The water will shoal regularly, but quickly up to its edge, and when on it, the bottom is somewhat harder than on either side of it.

KHARIJ, or KARAK, is an island 4 m. in length, N.N.W. and S.S.E., of moderate height, about 250 ft.; distant from Bushire N.W. by W. 9 leagues, and may be seen from the road off Bushire in clear weather, the tomb on summit being 284 ft. high. The fort is on the low N.E. point of the island, in lat. $29^{\circ} 15\frac{1}{4}'$ N., lon. $50^{\circ} 20\frac{1}{4}'$ E., and may be passed within a cable's length. On the N. and E. sides this island may be approached to 7 fathoms, but on the other sides it is not safe to come under 15 fathoms. The whole island except the N.E. sandy point is lined with coral rocks, which on the N. and S. sides extend in some places half a mile from the shore. The channel between Karak and Korgo is very safe, and about a mile wide in the narrowest part: but no vessel should use it at night. Two steamers have grounded in the attempt to pass through, and little can be gained by it.

Anchorage. If the wind blow strong at S. or S.W., a ship may find anchorage near this island. She ought to anchor between the islands of Karak and Korgo in 6 or 7 fathoms smooth water; but if a sudden change of wind from the N.W. be apprehended, it would be imprudent to remain in this situation; in such case she ought to weigh immediately, and after passing round the fort, at more than $\frac{1}{2}$ m. off, should anchor to the S.E. of it in 9 or 10 fathoms, about $\frac{1}{2}$ m. from the shore. With a N.W. wind, the best anchorage is in 9 fathoms sand, the brab-tree in the fort bearing N.W. by W., and the S. extreme of the island S.S.W. With a S.E. wind run into the channel, and anchor to the northward of the large bushy tree near the wells, it bearing S.S.W., the fort point S.E. by S., and the N.W. extreme of Karak bearing W., in 8 fathoms sand.

The water at Karak is much better than that of Bushire, particularly at the wells on the N. side of the Island near the large tree: fire-wood is very scarce; what they have being brought from Bunder Righ and the N. coast. Fish, which is plentiful, and dates, form the principal food of the inhabitants, for they have no grain but what comes from Bushire, and very few vegetables. Bullocks, sheep, and poultry are to be procured, but at exorbitant prices, when a supply is wanted. The best pilots for Basrah are procured at this place; to carry a ship there and back, they generally receive 150 or 160 rupees, with the addition of 50 more for the trankey that attends, and provisions for five or six people. It is customary to give a bag or two of rice to the sheikh, and one to the pilot's family. During the time the ship is stationary at Basrah, he receives 10 rupees per month. Karak is also sometimes called Khâreg or Kharg.

KHUWAIIRIJ, or KHARGU, or KORGÓ, is a small, low, sandy island, 3 m. long and $\frac{1}{2}$ m. broad; it is $1\frac{1}{2}$ m. N. of Karak, and its N. point in lat. $29^{\circ} 20\frac{1}{4}'$ N. Except on the N.E. side, it is surrounded by a bank of coral rock. The shoal extending from the N.W. side of Korgo, about $\frac{1}{2}$ m., should not be approached under 10 fathoms, as the water shoals from 7 fathoms suddenly to 6 ft. coral rocks. To avoid this reef in coming from the N.W., do not bring the N.W. extreme of Karak to the W. of S. by W. till the fort bears S.E. by S.; you may then haul up for the channel, keeping better than $\frac{1}{2}$ m. from Karak. The N. and E. sides of Korgo are not so dangerous, the depths there decreasing gradually to the edge of the rocky bank that surrounds it. The best anchorage is near the N.E. part of the island, where are a few stunted date-trees, and near them a watering-place. The ground about these islands is very indifferent for anchorage, being loose, hard sand in several places.

Channel between Karak and Korgo. A regular tide runs through the channel between the islands, from $1\frac{1}{2}$ to 2 knots per hour on the springs; flood to N.W., ebb to S.E.; H. W. about 8 h. on F. and C. of moon. (See also NAVIGATION further on.)

THE COAST from Ras-es-Shat trends to N. about 19 m. to Bunder Righ, in lat. $29^{\circ} 24\frac{1}{4}'$ N., lon. $50^{\circ} 38'$ E., nearly N., and is safe to approach by the soundings. Bunder Righ is fronted by two small isles: and Khor Gassair, which is an inlet to the S., in lat. $29^{\circ} 11'$ N., is fronted by a shoal bank projecting $1\frac{1}{2}$ miles from the shore. **Ras Poshoon**, in lat. $29^{\circ} 39'$ N., lon. $50^{\circ} 25'$ E., is 6 leagues about N.W. by N. from Bunder Righ. S.E. of Poshoon is Gonarra, or Kanawah Bay, so called from the mosque and extensive ruins of this name near the shore, in lat. $29^{\circ} 34\frac{1}{4}'$ N. About a mile to the S. of Gonarra is a small inlet called Khor Khalil. In Gonarra Bay, ships may

anchor in 4 fathoms, and be sheltered from N. winds by the land of Ras Poshoon projecting to the W. About 7 m. to the N.N.W. of this headland, is the summit of Kuh-i-Bang, 1,000 ft. high.

Ras-el-Tomb, in lat. $29^{\circ} 58' N.$, lon. $50^{\circ} 9' E.$, is 8 leagues to the N.W. of Ras Poshoon, and the coast, which has some inlets or shoal creeks, runs in this space nearly in a direct line, and is free from danger, the soundings decreasing regularly to the shore.

DUHET DILAM, or **DEILIM**, is a large bay formed to the N. of Ras-el-Tomb, on the E. shore of which is Bunder Deilim, in lat. $30^{\circ} 3' N.$, lon. $50^{\circ} 10' E.$, bearing N. by E. 2 leagues from the cape, and a little to the S.E. of it there is a remarkable table-hill near the sea, 165 ft. high. The N. shore of Duhet Deilim takes a W. by S. direction towards the sands and islands of Ras-Hul-Barkan. The Bay of Deilim has regular soundings of 5 and 4 fathoms, decreasing to 2 fathoms near the shore.

Coast above Bu-shehr. The coast runs about N.N.W. for about 73 m., to the head of the bay called Duhet Deilim, the N.-most bight of the Persian Gulf; and then turns to W.S.W. for 28 m. to Barkan, at which point the delta formed by the rivers commences. The whole coast is free from danger, and the soundings are regular. To the N. of Khargu Island, the depths are under 20 fathoms quite across the Gulf, decreasing towards the rivers. The tides are perceptible all along this shore, increasing in strength to the N.: they set along the coast and round Deilim Bay.

Mountains. The shore is low, the mountains being at some distance inland, excepting **Kuh-i-Bang**, which is a range of hills 1,000 ft. high, and visible upwards of 30 m.: the highest part is 30 m. N. $\frac{1}{4}$ E. from Karak Island, and it lies only 2 m. from the coast, having a precipitous face on its seaward side; so that from the S. it makes in a remarkable bluff of light colour, with rather a jagged outline. The range extends 12 m. about parallel to the coast.

To the N. of Gisakun Bluff, are a series of mountain ranges 30 to 40 m. from the coast, over which are seen the tops of others, covered with snow in winter. Inland of Kuh-i-Bang, and separated from it by a valley, is a range about 15 m. from the coast 2,000 to 3,000 ft. high, but with no conspicuous peak on it. Its S. end is 30 m. N. of Bu-shehr, the country S. of it being apparently a dead flat from the coast as far inland as the Gisakun range.

A range of lower hills, running E. and W., comes within 3 or 4 m. of the head of Deilim Bay, and thence turns to N.W. into the interior, decreasing in height to the W. This range is the W.-most on the Persian coast; the whole head of the Gulf W. of it being a low alluvial plain. On this range 25 m. E. $\frac{3}{4}$ N. from Deilim town, is a sharp peak, remarkable when on that bearing; and at its W. extreme, as seen from Deilim Bay, is a remarkable funnel hill, which is 26 m. N.W. $\frac{1}{4}$ N. from that town, and 550 ft. high.

Kuh Behbahun, in lat. $30^{\circ} 28' N.$, lon. $50^{\circ} 55' E.$, is a great mountain mass of irregular outline, lying in an E. and W. direction; the highest part is 10,400 ft. high, and in very clear weather is seen 125 m., or from the bar of the Basrah river. The summit is 46 m. N.E. by E. from Deilim, and has snow on it for six months in the year.

RAS HUL BARKAN, in lat. $30^{\circ} 1' N.$, lon. $49^{\circ} 36' E.$ is a very low point formed by a strip of sand with turfs of grass, nearly overflowed at H. W. Inland of it, all is swampy for some miles. At a distance of 3 m. are seen, when near the point, some date groves and a tomb called Mir Amman, which are probably on the Hindiyan or Tab river. Mud flats, overflowed at H. W., extend some miles W. of the point, and also $\frac{1}{4}$ m. off its S.E. side. As 2 fathoms are 3 m. off to the S., this point can only be sighted by a small vessel. The coast to the E. continues low with shoal water off it, as far as Shah Abu'l Shah. As the soundings are regular, it is safe to approach by the lead.

Ras Tunub, or **Tuloob**, is a low point of the main, with a few shrubs and some brush-wood near it, lying 18 m. W.N.W. of Ras Barkan. About 3 m. to the N. of it, is the mouth of a river or creek, joining the Tab river, with some extensive ruins on its banks. The coast to the N. of this point has not been traced, it is nearly all overflowed at H. W.

Fasht al M'ayrith, or **Miairis**, is an extensive bank of sand and mud, extending 11 to 12 m. S. of Ras Tunub, and dry in patches at L. W. There is a channel, called Khor Ghazlan separating it from Ras Tunub, and the shoal is divided into two parts by a narrow channel, running E. and W., with 5 to 7 fathoms in it. The channel between this and the shoals of Barkan is about 4 m. broad with deep water, and is called Khor Barkan.

Bunneh is a low narrow island $3\frac{1}{4}$ m. long, with a ruin on it, lying 2 m. W. of Ras Tunub, with a deep khor between it and that point. **Deireh Island** is low and partly swampy; it lies 3 m. S.W. of Bunneh, and there is a deep water khor between them, running to the S. called Khor Wasteh. A sand bank lying S. of this island, and steep-to, is called **Aish-es-Shehm**. To the N. of these islands are many banks with deep channels between, lying on the E. side of Khor Moosa, which have not been explored; they have in places 15 fathoms and upwards.

KHOR MOOSA is a great salt water inlet, receiving the water of the Dorak river, and perhaps a branch of the Karun. It runs in a N. by W. direction, passing about 5 m. to W. of Deireh Island; but is not sufficiently known to be attempted without a pilot. On the W. side of Khor Musa is a low swampy tract, about 15 m. in breadth, between that creek and Khor Bamishir. The S.E. point of it is called Bu Seif; and the entire flat of shoal water off it, extending to Khor Gafgah, is called **Maydan Ahli**, or **Ahli Maidan**, with soundings increasing regularly to 4 fathoms about 13 m. from the dry part: it is about 15 m. in breadth, and the soundings are quite regular on it. The bottom on it is mud and sand, the latter predominating as the shore is approached. Pilots feel their way along its edge in making the Basrah river.

Off the S.W. corner of the Meidan 'Ali is a rocky bank, least water said to be 4 fathoms. It is not a danger for ships bound to the river, as no greater draught than 19 ft. ever crossed the bar. This bank lies S.E. by E. from the bar of the Shat al 'Arab.

Khor Bamishir, or Behmeh Shir, a khor on the W. side of the Meidan 'Ahli, is the natural mouth of the Karun river: it runs up the country nearly parallel to the Shat al 'Arab, and joins the Karun near the Mohammerah, but is shallow near its junction with that river; it was formerly navigated a long way up. The soundings at the mouth of this khor, where it crosses the Meidan 'Ali, are hardly different from the regular soundings on the flat.

Khor Khafgeh is a deep khor running nearly parallel with the Shat al 'Arab, on the W. side of the Meidan 'Ali, with soundings decreasing from 15 fathoms at the S. end, to 3 and 2 near the shore called Abadan. This khor does not enter the land, but bends round at 2 m. distance from the coast, and taking a W. direction, joins the Shat al 'Arab, about $1\frac{1}{2}$ m. below its entrance between regular dry banks.

SHAT EL ARAB, commonly called by English sailors, the **Basrah River**, or **Euphrates**, is the united stream of the Tigris and Euphrates. It is a fine river, navigable for large vessels drawing 18 ft., beyond Basrah, or to a distance of about 80 m. from the bar. Its breadth near the mouth averages three quarters of a mile, with soundings of 3 to 4 fathoms at L. W.

The bar of the river is in about lat. $29^{\circ} 46' N.$, lon. $48^{\circ} 40' E.$, between two banks; the Abadan Bank on the E., and the Abdallah Bank on the W. In the middle of the entrance lies the middle-ground shoal, or Aish Miyun, to the W. of which is the fair channel which the pilots always use. The Bar has lately been marked by **Buoys** which are shifted when any changes occur in the soundings. A large vessel must wait till near H. W. before she can enter.

Tides. The least water on the bar, at low spring tides, is 12 ft.; H. W. on F. and C. of moon at a little before Noon. The rise and fall at springs varies from 8 to 10 ft.; a S. wind causing the higher rise. Arab pilots say there is a depth of 4 fathoms at H. W. on the bar, twice in the year, viz., in June, when the snow melts on the mountains, and in October; but at other times only $3\frac{1}{2}$ fathoms. Captain Constable says the July spring tide at Bushehr is the highest in the year. The distance from the Bar to Basrah is about 80 m.; the tide is about one hour later at every 15 m. of distance, so the time of H. W. on F. and C. at Basrah is about 5 or 6 h.

Pilots. As already stated, the pilots for the river reside at Karak Island, where they are taken on board by ships proceeding to Basrah; they are indispensable. The rate of pilotage is 15 kerans per foot draught for each time they cross the bar; and $1\frac{1}{2}$ kerans per day as long as the vessel remains at Basrah or M'akil.

Directions from Bu-shehr to the River. On leaving Karak with a fair wind, the pilots steer to N.W. till in 10 fathoms off Ras Barkan; the course is then W.N.W. and W. by N. till on the Meidan Ali, the soundings along which convince them of their approach to the river; on this course the water will deepen to 12 fathoms crossing Khor Barkan, then shoal to 7 on the tail of the M'ayrith, again deepening to 15 in Khor Wasteh. After getting 7 fathoms on the E. bank of Khor Moosa, she will cross that khor in 12 fathoms, perhaps getting a cast of 8 on the narrow ridge in the middle of it, and would then strike the Meidan 'Ali in 5 fathoms. The khors, and banks between them, all have continuations a long way to seaward, perfectly defined by the difference in the depth of water, the soundings in which are what the pilots entirely trust to to make the river. The reason of their making a course round by Barkan is to ascertain how many of the khors they have passed. When once on the Meidan 'Ali they feel certain of their position.

Passing to N. of Karak, with a foul wind, they work up the Persian coast till past Kuh-i-Bang, and will be off Barkan in 4 to 5 fathoms: in standing across W. to the Meidan Ali from that position, she would get successively 10 or 11 fathoms in Khor Barkan, 3 or 4 off the M'ayrith sand, 12 in Khor Wasteh: 4 fathoms on the bank off Aish-es-Shem, and 9 in Khor Moosa, getting on the Meidan Ahli in 3 fathoms.

When sure of being on the Meidan, by the regularity of the soundings, stand across it W. by S. to W.S.W., so as to keep in a line of 4 to $4\frac{1}{2}$ fathoms, L. W.: if you cannot lie up high enough,

a short tack or two must be made to the N., working between 4 and 6 fathoms, so as to be in the above depth when leaving the flat. If the tide is unfavourable, with a working wind, the pilots anchor on it for the flood. If a strong S.-Easter is blowing, they will not attempt to cross the bar, but will wait till it is over.

If you cross the Meidan Ahli in 4 to 4½ fathoms, you will get 13 to 16 in Khor Khafgeh, and will cross the tail of the Abadan in 4 or 5 fathoms, sandy bottom, deepening again to 7 or 8 in the entrance of the Shat-el-Arab. The pilots stand across till they shoal on the 'Abdallah bank, and then tack, working between that bank and the Miyan sand, till past the bar. In crossing the mouth of the river from Khor Khafgeh, you will have a little shoaler soundings in the centre, on the tail of the Miyan sand, but the 'Abd-Allah bank is recognized by the very soft nature of the bottom.

If you cross the Meidan in 3½ fathoms you will get 12 in Khor Khafgeh, which would be due E. of the S. end of the Miyan, and must then keep a little to the S. to avoid that bank. In working past the Miyan, you should keep on the 'Abd-Allah side, tacking directly you shoal the water near the Miyan, as it is very steep-to. A large vessel must of course wait till near H.W. before attempting to cross the bar.

From the bar to the entrance between the dry banks of the river, both the 'Abdallah and Abadan banks are steep-to, and the pilots tack immediately on shoaling; the W. bank, being softer, is the safer to borrow on. The reeds at the mouth of the river will be seen soon after clearing the bar. After leaving the Meidan 'Ali, if a working breeze, it will be necessary to anchor as soon as the tide makes against you, the ebb stream running 7 to 8 hours, or even more. The direction of the channel after passing the bar is about N.W. ¼ N. with soundings of 8 to 4 fathoms at L. W.

Bouys. Four buoys are laid down in the entrance channel by the British Government, one on the S.W. corner of the Miyan sand; the channel lies to the W. of this. The other three are on the edge of the 'Abd-Allah bank, and must be left on the port hand. A vessel is apt to be set over by the tide to one side or other of the fair channel, which is narrow being under half a mile in width in certain parts.

Return Voyage from the River to Karak Island. When bound from the river to Kharg and Bu-shehr, on clearing the bar and being in 5 fathoms, although the pilots are supposed to take the vessel back to Kharg, it is preferable to verify their proceedings, by attending to the navigation, being in the open sea, they are not to be depended on, nor indeed required, except perhaps on approaching Kharg.

The course to Kharg is E.S.E., distance 94 m. After crossing several deep channels, or khors, and perhaps getting a shoal cast of 6 fathoms on the tail of the rocky bank (least water at L. W. said to be 4 fathoms) off the Meidan 'Ali, the soundings increase, though irregularly, to 20 fathoms at 30 m. from Kharg.

In making the island by day after sighting it, steer to pass through between it and Khuwairij, but if it has to be made by night, it is necessary to steer for the S. end, which is a high bluff, and shows better by night; the reef extends at most a quarter of a mile off the S. end. Khuwairij being so low, may never be seen at night, till aground on the reef. Two steamers have grounded trying the passage through the Strait at night. When the island is sighted (by day) the ship would be in 22 fathoms, deepening to 25 or 26 close to the S. end. When the island bears N., the water will shoal quickly to 18, 14, and 12 as you haul round, remembering that 7 or 8 fathoms is close to the reef. If running down before a Shemal, you may expect gusts off the island when hauling up for the anchorage, which should be done gradually with the lead kept going, anchoring in 10 to 12 fathoms, when she has stretched about 2 m. up from the S. point.

If working down in a S.-Easter, the pilots (after one or two days, at any rate) are necessarily dependent on the ship's observations, as they do not understand the navigation of the open sea. If, after leaving the bar, a S.-Easter suddenly sets in, the vessel must carry on to get out to sea, as the pilots in that case will not attempt to recross the bar. If obliged to anchor, she would ride it out best on the Meydan Ali, where it is said the force of the sea is less than in the channels, or than when farther out.

Passage up the River to Basrah. There are large herds of cattle and buffaloes along the banks of the river; the latter often swim across to graze on the islands in it. The banks are very low on either side for the entire distance, and intersected by numerous canals for irrigation; the land is often under water, except small raised banks between the plantations. The belt of land near the river is exceedingly fertile, and produces the finest dates in the world, also fruit and vegetables of various kinds, with grain, &c. At the back of the date-groves, which extend ¼ to 2 m. from the bank, all is a desolate swamp. Many wild pigs are found along the banks. On the ebb the water is quite fresh even at Fau, and fit for drinking, a little farther up it is so at all times of

tide. Between the plantations of trees, are sandy tracts of land along the banks, which are uncultivated, although doubtless equally fertile with the rest. Supplies of fruit, vegetables, and cattle, can often be obtained at the villages on the banks, while waiting for the tide. The land on the E. side, S. of the Hafar, which forms a long narrow island between this River and the Bamishir, is called Abadan. This River, from the mouth nearly as far as Basrah, is the boundary between Turkish and Persian territory.

In entering Basrah River, the rushes are discerned at 9 or 10 m. distance, but the pelicans are sometimes seen before the land, appearing on the banks in great numbers, and making it resemble a white beach. The winds blow mostly down the river all the year round, and when a N.-Wester is violent, the atmosphere is obscured by the sand driven along before the wind. After entering between the regular banks with vegetation, the eye is the chief guide. The S. part of these banks is quite swampy, all of soft alluvial mud, thickly grown with reeds and coarse grass. Landing is almost impossible, so soft is the mud. The direction of the River is about N.W. from the mouth till past the village of Fau (on the right bank, subject to the Sheikh of El-Kuweit). Abreast of Kusbeh (on the left bank), in lat $30^{\circ} 1' N.$, the trend of the River is to N. by E.; and here, as at other similar bends, the pilots anchor during a shemal; those reaches, which run more N.W. and S.E., giving shelter from that wind, are called Bunder Shemal.

We need not describe the further windings of the Shat-el-Arab River, which, from the mouth to Basrah, has a course of about 60 m.

Passage down the River. In the passage down the River, there is generally a fair wind. After passing Fau, the pilots make a slight zig-zag course, so as to shoal first on one side and then on the other, but since the buoys have been laid down, a course is shaped from one buoy to another. A course is steered E.S.E. for Khareg, as soon as you deepen over the bar to 5 fathoms. The soundings on this course will be 15 fathoms in Khor Khafgeh, then shoal to 7 on the tail of the rocky bank off the Meidan 'Ali, afterwards, over-falls of 15 to 8 or 9 fathoms; the water at last increasing regularly after being clear of the different khors off the River. The pilots will not take a vessel over the bar, either in a strong shemal or in a S.-Easter.

BASRAH, or BUSSORAH, the port of Mesopotamia, lies nearly 1 m. from the river, and is approached by a small creek, the mouth of which lies about the centre of that reach of the river called Basrah Reach. The only buildings seen from the river are a tall minaret in a suburb on its banks, and the wall surrounding it. There is a flag-staff on which the Turkish flag is hoisted, at the Custom-house, which stands on the N. side of the entrance to the creek, in lat. $30^{\circ} 32' N.$, lon. $47^{\circ} 51' E.$ A Turkish guard-vessel, which is a small old-fashioned grab-ship or brig, is always stationed off the town. The Turks have lately got some small gun-boats, and have begun to run steamers between Basrah and Baghdad. An English company has also begun to run steamers on the river. The town of Basrah is believed to contain at present 5,000 inhabitants, a mixture of Arabs and Turks, with some Persians, Armenians, and Jews. There are also many Banyans. There is a large fluctuating population, not permanently resident, of which it is difficult to give any probable estimate. Most of the buildings within the walls, which are of great extent, are ruinous: the present houses are chiefly of sun-dried bricks, and the streets are filthy in the extreme. It is governed by a Turkish functionary, who is under the Pasha of Baghdad. The heat in summer is intense, and the town is considered extremely unhealthy from June to Oct. Malignant fevers are then prevalent. In winter cold weather is experienced, sometimes even a white frost.

A considerable trade is carried on with India, though the number of European ships visiting it has much diminished. Horses, dates, rose-water, &c., are exported; the imports being piece goods, rice, &c., from India. Some English merchants settled at Baghdad carry on a direct trade with England.

Anchorage. A ship should anchor here in 4 to 5 fathoms in mid-channel, opposite the entrance to the creek, and should moor with open hawse to the W. The creek is nearly dry at L. W., and only entered by small boats; large native vessels lie out in the river to discharge cargo; passengers usually go up to the town in long canoes called bellum, which are propelled by poles at a considerable rate. There is a road or path to the town along the S. side of this canal or creek, which is bordered on both sides by gardens, the trees in which overhang the water. Besides date-trees there are pomegranates, and many other fruit-trees.

M'akil, or Mahghil, the site of the British vice-consulate, is about 4 m. above Basrah, and 1 to $1\frac{1}{2}$ m. beyond the end of Basrah Reach, the river here turning more to the W. The consulate is a large square building with a flag-staff. It is the place generally visited by Government vessels; the armed steamer which carries the mail between Basrah and Baghdad also stops here. A small quantity of coal belonging to Government, is kept in store, and the building is used as a small depôt for stores, &c., for the use of the river steamer. Above M'akil the river as far as Kurnah, at

the junction of the Tigris and Euphrates, is navigable for small vessels; the tide is felt 20 or 30 m. beyond this point, which is 45 m. above M'akil. The tide in the river is said to be about six hours later at Basrah than at the bar. The strength of the ebb in the river varies from 3 to 6 knots, that of the flood from 2 to 4 knots; the ebb-stream being about double the duration of the flood. If at anchor in the river during the ebb, plenty of cable will be required, especially if a shemal is blowing.

GENERAL DESCRIPTION OF PERSIAN GULF.

The two sides of the Persian Gulf differ widely in character, the Persian coast being mountainous, generally safe to approach, and having deep water close to it; whilst the Arabian coast (excepting the mountains of the Ruweis-al-Jebal) is exceedingly low, and fronted by reefs and shoals to a great distance from the shore, for nearly its whole length, forming the celebrated Pearl Banks. Ships, therefore, in passing up and down the Gulf, always keep on the Persian coast, seldom standing over farther than the edge of the shoal water of the Pearl Banks.

The Gulf of 'Ohman is singularly free from danger, and has deep water almost close to both coasts, which also have high mountains within no great distance of the shore.

The **N. coast**, as the Persian side may be termed, presents in its whole extent, from the delta of the Euphrates to the Mekran coast, a series of rugged, precipitous mountain ranges, one behind the other; running generally nearly parallel to the coast, and to each other. They increase in height as they recede from the sea, and no kind of vegetation can be seen on their bare and deeply-furrowed sides. Being visible at great distances, they form excellent land-marks. They are separated by wide valleys, and there is a belt of low land of varying width between them and the sea, called by the Persians the Germisir, or hot district. Situated at the S. foot of these mountains, watered by no river, and its summer heat tempered by no rain, this district well merits the appellation, being, with the exception of the opposite coast (between El-Bahreïn and Abu Zhabi), the hottest place in the world, in summer.

The small seaport towns are almost exclusively inhabited by Arabs, who originally came from the opposite coast, and formed settlements there, owing to intestine commotions in their own country, or to a spirit of enterprise. At the larger places, an admixture of Persians is found, and the rural population is exclusively Persian; but the Persian is not a maritime nation, all the boats sailing from Persian ports being manned by Arabs.

The coast is generally uninviting and barren, except near the villages, where date-groves are generally found, with a small amount of cultivation. There are no rivers, as we understand the word; and water is generally only found in wells or reservoirs of rain-water. There are no good harbours for large ships, though there are plenty of roadsteads or anchorages sheltered against one or other of the prevailing winds, though not against all.

The **S. coast**, from the river (Shat-el-'Arab) to the Ruweis-al-Jebal, is generally of white sand, a perfect desert, having extensive tracts quite uninhabited. Near the towns, however, there are generally date-groves, more or less extensive. Water is generally scarce and bad, and obtained in shallow wells near the sea.

The S. coast of the Gulf of 'Ohman, from the Ruweis-al-Jebal nearly to Maskat, is fertile and well grown with date-trees. It extends in a wide plain to the foot of the mountains, and is called the Batneh or Level coast. The population is exclusively Arab; in the towns they are civil to Europeans, and may be trusted; but it is not safe to land unarmed away from the towns on the main land, on account of the Bedouin, who are occasionally met with; and who attack, for the sake of plunder, even their own more civilised countrymen (the Arabs of the towns).

The navigation of this Arab coast, between the Shat-el-'Arab River and 'Ohman, is seldom attempted at night; vessels should anchor at dark, if possible.

On both coasts the inhabitants are very poor, and the few supplies obtainable, are so only in small quantities. In particular, fuel (wood) is scarce; *water* only obtainable in your own *water-casks*. The stranger should bear in mind that an Arab is accustomed to drinking very bad water, and his ideas of what is good water might lead to disappointment; it is generally better after the winter rains, and more scarce or brackish in autumn.

The basin of the Persian Gulf must be silting up gradually at the N. end, owing to the great amount of alluvium poured into it by the rivers there. Periodical surveys will always be needed. We have not sufficient data to enable us to estimate the rate of growth of the delta with any degree of certainty.

The water of the upper part of the Persian Gulf is much saltier than that of the ocean.

WINDS. The navigation of the Gulf in a sailing ship requires great attention. The winds

as in most inland seas, are very uncertain, and blow occasionally with great force down the Gulf; and in winter, also in the opposite direction. They set in without much warning.

Shemal. The prevailing wind in the Gulf is undoubtedly the N.-Wester, called by the natives shemal, which blows about nine months in the year in the N. half of the Persian Gulf. It blows almost incessantly during June, and part of July (called the Great Shemal), seldom exceeding a moderate gale in force, and at times quite light. Its general duration is three days, but it may last seven days. The worst shemals often only last one day.

This wind blows down the Gulf, changing its direction with the trend of the coast. Thus, on the Arab coast from Koweit to Bahrein, its average direction is N. by W. to N.N.W.; on the Gutr or El-Katar coast N. to N.N.W.; and on the W. coast of 'Ohman from W.N.W. On the Persian coast it blows N.W. by N. down as far as Cape Berdistan, below Jebel Dreng, veering to N.W. and W.N.W. between that and Sheikh Shuaib. Off Kais the direction is about W. by N., and from Bostaneh towards the E. it blows from W. to W.S.W. at the entrance of the Gulf. In the Gulf of 'Ohman its general direction is N.W.

During a shemal, if after rain, the air may be clear and sky cloudless, but generally, in the N. part of the Persian Gulf, the air is so loaded with dust from the Mesopotamian deserts that a dense mist is the result. This makes the navigation very dangerous, as the land cannot be seen; the white surf on the beach is often first seen, while the land is still hidden. In the Shat-el-'Arab this is sometimes so much the case that neither bank of the river can be seen. Out of sight of land, a vessel's decks and rigging get covered with fine dust.

The air during the shemal is generally very dry and sky cloudless, but in the winter, they are sometimes attended at the commencement, by rain-squalls, (often with thunder and lightning), which generally clear off during the breeze. It veers during the twenty-four hours a few points, blowing more off the Persian coast, or from the N., at night; and off the sea, or more from the W., in the day, which a vessel should take advantage of when working against one. It sets in at any hour of the day or night, and generally suddenly.

The barometer cannot be said, as a rule, to give any warning of the approach of a shemal; if it was low before, it will begin to rise as soon as the shemal sets in, but generally not before, and continue high during the whole duration of the gale. It sometimes falls before a bad winter shemal, but rises again after the first burst of the gale. The barometer in the surveying ship, was not at all affected by one of the heaviest shemals; either before, during, or after it. This breeze is sometimes preceded by the drying up of the dew by night, or the dampness of the air ceasing, which is a pretty sure sign.

A heavy swell from the N.W., especially in the S. part of the Gulf, is often the precursor of a shemal, although such a swell sometimes occurs without any wind following it. Some of the heaviest winter shemals set in in fine weather, with no warning except a heavy bank in the N.W. quarter, an hour or two previously, which rolls down and gradually obscures all objects, and yet this occurs sometimes without any wind following. A ship should, however, by no means neglect such a warning. Nor should she ever anchor very close in-shore during winter time.

Ships should be prepared in winter during a S.E. gale, for a sudden shift to the N.W., especially at night, as the shemal often blows then very strong. On the 17th March, 1820, the E.I.C. brig of war *Ariel*, from the river, bound to Bu-shehr, was beating against a S.-Easter, under double-reefed topsails. At 1 h. a. m. 18th, sail was further reduced as a squall was expected from the N.W. This was scarcely accomplished when the squall burst upon them, and, taking her right aft, she ran through the opposing head sea, buried herself in it, and sunk about 20 m. W. by N. of Kharg Island. There were about ninety souls on board; of these only the surgeon, boatswain, and three of the crew were saved, on a canoe which floated off the booms.

The worst of the shemal is always at the beginning. It does not always extend over the whole Gulf, and often lulls for a short time about day-light. In the summer shemals the wind rarely exceeds the force of a moderate gale (7), but in the winter they are often fresh gales (8), or at times hard gales (9). It is generally advisable to seek shelter, if possible, during the strength of a shemal, as little or no way will be made against it; the Persian coast and islands offer many suitable places of shelter, and much wear and tear are thereby saved.

Shurgi or Koss. During the winter months, S.-Easters, called by the natives Shurgi or Koss, alternate with the N.-Westers; and, like the shemals, follow to a certain extent the direction of the coast; they only blow strong from Dec. to April. The koss is generally accompanied by thick, gloomy weather, with hard squalls, and often much rain, sometimes thunder and lightning. The atmosphere is moist, and the barometer generally low. With a falling barometer and cloudy threatening weather, a koss may be expected in the above months, but timely warning is not always to be expected, although the barometer always falls during the gale, if not before. It seldom blows

more than three days, its strength is generally a moderate gale (7), but at times it blows a fresh gale (8); the strongest often only last one day.

When the wind begins to veer to the S. the koss is over, and is often succeeded by a shemal, almost immediately; or it may blow hard for a short time at S. or S.W., and so die away, no shemal occurring for several days. The wind sometimes, however, after blowing hard at S.W., chops round suddenly to N.W., when a strong shemal will follow. The notion that a koss is always followed by a shemal is not correct.

If a vessel has anchored for the koss in an anchorage open to the shemal, she should weigh immediately the koss is found to be over, as she may otherwise have to ride out a N.W. gale on a lee-shore. Easterly winds are of most frequent occurrence in the S. part of the Gulf.

Nashi. In the winter, particularly in the S. part of the Gulf, strong breezes are experienced from N.E., called Nashi; they are attended by dark cloudy weather, and generally rain. The natives rightly make a distinction between these breezes and the koss. The barometer is not affected by this breeze, being generally high; and if so, it will fall a little when the nashi is over. There is sometimes, off the Persian coast, and off Shargah and Abou Zhabi, a dense haze before a nashi, caused by the dust blown off the land. This breeze often blows three or five days, but frequently only one day: after the first day the air becomes clearer. The nashi blows in gusts with frequent lulls, and if a three-day gale, is strongest on the third day. The nashi blows very strong in the Gulf of 'Ohman, and is much dreaded by native craft, as the Batneh coast is a lee-shore, and there is no shelter.

Saheili. The S.-Wester, called by the natives Saheili, is much feared by them, as it blows into nearly all the sheltered anchorages on the Persian coast. It lasts generally only a few hours, and often follows the koss, but sometimes occurs after fine weather; it is accompanied by rain, and is preceded by masses of clouds rising from the S., with lightning. It is not of frequent occurrence, and only happens in the winter months. It blows all over the Gulf, and also in the Gulf of 'Ohman, especially off Cape Koh-i-Mubarak.

Squalls. At the change of the seasons in autumn, very severe squalls may be expected, called Leheymah by the Arabs; it does not appear that the direction of these squalls is fixed. The period assigned to them by the Arabs is from the 15th of Oct. to the 5th Nov., during which time no native vessels put to sea, until either the squall is over, or until the 5th Nov. is past, if no bad weather happens before that date. On Oct. 28th, 1846, the E.I.C. surveying-brig *Palinurus* found thirty-five baghalahs at anchor in Khor Jerameh (Ras-el-Had), which had put in there to wait till this dreaded period was past. If they do not occur before the 5th of Nov., the Arabs consider that none will happen after that date, until the ordinary bad weather of the winter sets in. On Nov. 11th, 1843, the E.I.C. sloop of war *Coots*, at anchor on the N. side of the island Sir Abu Neir, had a S.E. gale blowing for one day and night; with dark cloudy weather and lightning. An unusual degree of electrical action is observable during the above period; St. Elmo's fire has been observed on board ship at this season. The air is often wonderfully clear about the time of these squalls.

In Basiduh roads very violent squalls have been experienced from the N. in May;* and from the S.E. in July;† but these are not of frequent occurrence. Very heavy squalls from the N. have been experienced in May in the N. end of the Gulf. A succession of squalls from opposite quarters, each lasting only a few minutes, and alternating thus several times, is occasionally experienced. In the winter, especially, tremendous gusts blow out of the great valley in the mountains below Maskat, known as the Devil's Gap.

Land and Sea-Breezes are very uncertain. In fine weather very decided land-winds are experienced, but only near the coast. Sea-breezes are very regular at Bu-shehr in the summer, setting in at 9 a. m., (when there is not a shemal); but land-winds are very slight and of short duration there. At Basiduh, the land-winds are strong and last till 10 a. m.; sea-breezes are also regular, but do not set in so early as at Bu-shehr.

On the Arabian coast the land-winds are often strong in the morning, and come off occasionally in hot gusts. At Koweit, the sea-breezes are regular in fine weather.

Gulf of 'Ohman. The S.W. monsoon is not felt inside Ras-el-Hadd; as soon as that cape bears S. the wind is quite lost, (the same occurs at Cape Guardafui). During the N.E. monsoon, nashis and shemals prevail: but in the summer, or during the S.W. monsoon, no shemals occur.

* May 27th, 1851. Heavy squalls from the N., with vivid lightning. At 9 p. m. the E.I.C. schooner *Tigris* drove with two anchors ahead until she struck off the hospital. The beacon, flag-staff, and many date-trees were blown down.

† July 29th, 1857. Threatening appearance in the evening. At 11 p. m., heavy squalls from S.E. with lightning. Rain so heavy that it filled the reservoirs in three hours. Mid-night, blowing fresh from N.W.

Calms and light winds prevail, or light S.E. winds, rendering the passage out of the gulf in a sailing ship very tedious.

General Observation. Especially in the winter, the winds are often very local, a shemal blowing at one end of the gulf, while at the other end, or even in the centre part, it is blowing in the opposite direction or is calm. At Bu-shehr the wind is often blowing the opposite way to what it is in the Shat-al-'Arab.

From the above remarks on the winds, it will be observed that the shurgi, or S.E. wind, blows into the Gulf, during the same period, though not so continuously, as the S.E. wind of the Red Sea between Nov. and April. The Nashi of Ohman, and the S. part of the Gulf, synchronises with similar bursts of the N.E. monsoon, or land-wind, at Karachi and the Gulf of Cutch. And again, the period of the great shemal, June—July, is when the N.W. winds are strongest in the Red Sea.

WEATHER. The climate of the Persian Gulf is one of the most trying imaginable; though perhaps on the whole not unhealthy for Europeans. The intense heat of the summer is aggravated by the humidity of the atmosphere, and the dust raised by every wind; nor are there rains or clouds at this season, as in India, to temper the excessive heat. The Arab coast is hotter and less healthy than the Persian, and the S. end of the gulf hotter than the N. part.

In winter, the winds are cold and cutting, although the temperature is more suited to Europeans; but fevers are then prevalent, and it appears to be less healthy than the hot season.

Jan. and Feb. are cold and boisterous months. Gales of wind prevail with rain, and what is termed by seamen "bad weather." The minimum of temperature, 45° to 50°, occurs in the first half of Feb. March is an agreeable month as to temperature, and the weather generally fine and clear, the winds variable. The natives consider the bad weather over in the beginning of this month for the S. end of the gulf. In the N. part of the gulf, a gale often occurs about the equinox, but intervals of variable winds and fine weather are frequent (though some bad weather still occurs).

April is a pleasant month, though getting hot (80° and more) towards the end. The weather is generally fine, with moderate shemals now and then. In the N. part of the gulf a very heavy shemal has occurred in this month, also heavy squalls, or a gale from the E. Variable winds however prevail, with sometimes rain. There is seldom bad weather after middle of this month.

May. The weather getting hot (over 85°) in this month. It is generally fine, moderate shemals frequent; bad squalls have been experienced, but are exceptional.

During June and the first half of July, the heat at the N. end of the gulf is moderated by the almost constant shemal (the air during these months is generally loaded with dust); but from that time to the end of Aug., the heat is most intense, and with a S. wind almost insupportable, from the increase of moisture in the air. In the month of Aug., the thermometer has been known to rise on shore to 150° Fah. in the sun. In the shade on board ship its range is small, from 90° to 93° at night till sunrise, to 96° or 98° in the afternoon at Bu-shehr; but it must be remembered that the daily sea breeze keeps it comparatively cool. At Basiduh it is a little higher. In the Shat al Arab the thermometer is stated by Loftus to have risen to 124° in the shade. The intense heat of the nights renders the weather more distressing.

Sept. is but little cooler than Aug.; the nights however are less oppressive, particularly towards the end. The heat of these months is necessary for the maturing of the date crop. Oct., though still hot, is by comparison quite endurable; towards the end the squalls which generally occur, reduce the temperature considerably. Nov. is generally a beautiful month; fine weather, with often wonderfully clear atmosphere; temperature pleasant.

Dec. is often a fine cool month, similar to the last; unless the bad weather sets in, but it seldom does before the middle of this month. It more frequently comes on at the end of this, or the beginning of the next month, and occasionally does not set in till near the end of Jan.

Calms are frequent in the Persian Gulf and Gulf of 'Ohman, sometimes lasting for days. The saying of our seamen, that "there is always either too much wind or none at all in the gulf," is very true; moderate steady breezes are almost unknown.

Water-spouts, or sand-spouts on shore, have been frequently observed.

The Rain fall is small and variable; it may average 6 inches, or from that to 8 in the year. This is at Bu-shehr, where alone it has been approximately registered. On the Arab coast it is probably less. With rare exceptions it falls only in the winter months. On the Arab coast, the S. bay of the gulf, the rain is said to fall very rarely.

Dews are very heavy, particularly in the summer months, when the sails appear in the morning as if a heavy shower had fallen.

Dense fogs, wetting everything like rain, occur at times near the coast, and always in the morning. They only last a few hours.

Barometer. The range of the barometer is not great, compared with more N. latitudes, although greater than in the Indian ocean.

In winter the utmost variation is 0·6 inches, the height ranging between 29·70 and 30·30; average about 30·00. In summer there is a remarkable permanent depression of the mercury, due to the S.W. monsoon of the Arabian Sea. It begins to fall about the beginning of May, and during June, July, and Aug., stands with little variation at about 29·55, varying between 29·45 and 29·65; by the end of Sept. it again stands at its average of about 30·00.

The diurnal variation of the barometer is somewhat peculiar; there is only one maximum, at 10 a.m., and one minimum at 4 p.m., from which time it rises gradually till 10 the next morning; the depression which should occur at 4 a.m. being hardly perceptible. The barometer is not a safe guide as a warning against bad weather in the gulf, the worst weather sometimes occurring without any change in the mercury column, or the change not occurring till the gale has set in.

The **TIDES** have been scarcely at all attended to, and not very much is known about them. The rise and fall at springs varies in different parts between 6 and 10 ft., while at neaps it is only from 1 to 4 ft. At neaps the rise above L. W. springs is from 3 to 7 ft. The day and night tides are very unequal. In the winter the night, and in the summer the day tide is the superior, while the second tide in either case is quite insignificant. The rise and fall is affected by the winds, as is the general level of the sea, to the extent of 1 ft. or more; the shemal lowering the general level of the gulf, and the S.-Easter raising it; so that in the first case the tides will appear not to rise so high and to fall lower than usual, and the reverse in the second case.

The highest tides occur about the Aug. springs, which may be attributed to the heaping up (during June, July, and Aug.) of the water of the Arabian Sea on its N. coast, due to the S.W. monsoon.

The tide-wave takes about one hour in its passage from Maskat to the entrance of the gulf, and thence about 13 hours more to the head of the gulf. The tide-hour, or time of H. W. at F. and C. at Maskat is about 9 h.; at Cape Musendom about 10 h.; at Basiduh 12 h.; at Kais 1 h.; at Congoon Bay (Persian coast) and Ras Rakkin (Arab coast), about 5 h.; at Bu-shehr 7½ h.; and at the bar of the Shat al Arab 12 h. Its progress in the deep water of the sea of 'Ohman being much faster than in the shoaler water of the gulf.

The tide stream appears at first sight very anomalous, especially at the S. end of the gulf, owing to the turning of the stream being by no means coincident with the time of H. W. and L. W.

In the gulf of 'Ohman on the Batneh coast, and outside Ras Jashk, the tide stream is almost imperceptible, though the rise and fall is 6 to 8 ft. In proportion as the sea narrows towards its junction with the Persian Gulf, the stream begins to be felt, and is strong off Ras el Kuh, and towards Gru, Minab, and Hormus. It increases as the breadth of the sea diminishes, attaining its greatest velocity at the sharp turn at Ras Musendom, where it runs about 4 knots, and perhaps more at springs, with strong eddies and races near that cape, and between it and The Quoins, rendering a sailing vessel almost unmanageable. On the coast opposite it is not so strong, perhaps 2 or 3 knots off Gru.

Entering the Persian Gulf the strength of the flood-stream sets towards Hormus, Larek, and El-Kishm, flowing to the W., at the rate of 2 or 3 m. per hour, along both the N. and S. sides of these islands, and past the Tumbs.

Coasting round Ras Musendom, it flows to the S.W., past Ras-el-Khaimah to Aboo Zhabi, but its velocity along this coast is much less than it is to the N.

The peculiarity of the tide-stream off Basiduh and the Tumbs, off Faroor and El-Kais is, that it runs on for three hours each way after the turn of tide, as shown by the gauge.

The tide-wave reaches Cape Rakkin and the bay between Nabend and Berdistan, at about the same time, and here the stream is much weaker.

From Ras Rakkin the flood-stream sets to the S. on both sides of the Gutr coast at 1 and 1½ knots per hour; and also comes from the E. through and over the reefs S. of El-Bid'ah, meeting the tide which sets along shore from Abu Thabi to the W., somewhere at the S.W. extreme of that deep bay. They are generally weak in this S. bay, except locally.

The flood sets to the S. along both shores of Bahrein Island, and is strongly felt through the great reefs N. of it. It also sets to the S. off El-Katif, where it runs about 2 knots per hour. North of the Fasht-el-Yarem the stream sets E. and W. about 1 knot an hour across the pearl-banks, often throwing a vessel out of her reckoning in making Bahrein. It also sets about E. and W. through the islands near Farsi.

It runs with increased strength at the corner formed by Ras Mutaf, where the water is much discoloured; thence to Bu-shehr, and on the Arab coast opposite, the tides are weak.

At Kharg, tides of 1 to 2 knots are experienced, setting N.W. and S.E.; and the strength

increases as the rivers are approached. In the N. part of the gulf there is much less difference between the time of the turn of stream and H. W. or L. W. At the islands near Kubbr, the tide sets 1 to 1½ knots about N.W. and S.E.; the flood also sets up along the Persian shore to Deilim, and thence W.S.W. to Ras Barkan.

In the rivers the tide-stream runs with considerable velocity, ordinarily 3 or 4 knots at springs, but when the snow melts on the mountains of Kurdistan, the ebb attains a velocity of 5 knots, while the flood is much weaker. The stream of ebb runs eight hours, and the flood only four or five; and here again the stream runs on some time after the tide has begun to rise or fall as noted along the shore line. The tide-wave occupies about six hours in its passage from the bar to Basrah or M'akil. (See also *Tides of Shat-el-Arab*, page 275).

PILOTS. Formerly all ships bound up the Persian Gulf took in pilots at Maskat for the gulf as far as Bu-shehr; this is still often the case. It seems, however, to be an unnecessary expense; particularly as the men generally offering their services are not trustworthy, their knowledge being very local. Pilots for particular localities (as for the Basrah river) are indispensable. If taken on board for the Arab coast, it is to be borne in mind that they are only to be depended on for the immediate neighbourhood of their own homes.

Health. It is in the cold weather that fevers are most prevalent; the so-called *gulf fever* of the remittent type is very dangerous, and convalescence is only possible by leaving the gulf. Cholera is generally present in some part or other of the gulf, and carries off great numbers of the natives; its ravages are said to be worst at Bahrein. Small-pox is also common; a small encampment at a short distance from an Arab town is probably a kind of lazaretto for this disease, and should be avoided by parties landing. Ophthalmia is common among the natives.

The hot weather does not seem to be absolutely unhealthy; the men suffer, it is true, from aggravated prickly heat, boils, &c., but provided they are kept out of the sun, and ventilation attended to, there will be probably little serious sickness. As little work should be done aloft by day as possible; awnings are absolutely necessary, and the men should sleep on deck (the dew does not appear to have an injurious effect). Nothing but extreme necessity can justify the exposure of the men to the sun, and white hats should be always worn. For those who may consider these remarks extravagant, the case of H.M.S. *Liverpool* may be recorded; through unacquaintance with the danger, this ship lost three lieutenants and twenty to thirty men in one day, just as she entered the gulf on her passage up to Bu-shehr, in Aug., 1821, from the *heat* only. The thermometer ranged from 103° to 106° (See previous remarks on *Weather*.)

PRODUCTIONS and TRADE. The great heat of the summer is very favourable to the growth of the date. The dates grown on the banks of the Shat-al-Arab, said to be the finest in the world, are sent to all parts of Asia; large quantities are also exported from the Batneh coast. The date is the staple food of the Arabs.

Pearls are the most important export of the Persian Gulf, and the fishery gives employment to the greater part of the maritime population; nearly all the pearls are exported to India. The season of the fishery is from May to Sept., during which time it is pursued with the greatest assiduity by the available part of the population. During the latter month, when the date harvest also occurs, the towns and villages are nearly deserted. From 2,000 to 2,500 boats are employed, ranging from 10 to 40, or perhaps 50 tons burden, the crews varying from eight or ten to thirty men. The value of the pearls raised in 1859 was estimated at £200,000 sterling.

The right of fishing is common to everyone, but the Arabs of different towns appear to have a tacit understanding about their respective fishing-grounds, or else, motives of convenience limit them to the neighbourhood of their own towns. Thus Koweit boats fish as far S. as Jeziret Bu 'Ali, the Bahrein boats from thence to Arzenah, the Abu Zhabi and Shargah boats to the S. and E. of that island. Nearly all the towns on the Arab side, and many on the Persian, send boats to the fishery. Abu Zhabi sends a greater number than any other town, viz. 600; Bahrein is next with 400; and so on, down to small villages fitting out only 10.

The proceeds of the fishery pass into the hands of a small number of wealthy Arab merchants residing at Lingeh and El-Kais on the Persian, and Bahrein, Abu Zhabi, and Shargah on the Arab coast. They pay the divers chiefly in food and clothing, making small advances to them during the winter to keep them in a state of dependence, the pearl divers being a highly improvident race.

The fishery is pursued on any banks where the bottom is hard and level, without rugged rocks, and not at a greater depth than 12 or 13 fathoms; the general Arab name for such a bank is Hehr. The longest time the diver can remain under water does not exceed one minute and a half. They can work at the bottom even in greater depths, as is proved by the following occurrence:—On the survey of the S.E. coast of Arabia in 1845, a three-pounder iron gun was dropped overboard from the E.I.C. tender *Nerbudda*, when at anchor in 15 fathoms, off Ras Fartak, in March. Some pearl-

fishers from El-Khabureh on the Batneh coast, on their way to Makallah and Ghubbet 'Ayn, were engaged to recover the gun, which they did for five dollars.

A few large boats leave Bahrein and the ports of 'Ohman to fish for pearls at Sokotra, and on the N.E. coast of Africa, in the cold season, returning in time for the fishing season in the Gulf. In 1860 thirty boats left the gulf for these distant fishing-grounds, twelve of which belonged to Bahrein.

Exports. A large number of horses is exported from the gulf to India (the Nejd Arab is perhaps the finest horse in the world); they are packed very closely in the native vessels, and often are damaged on the passage; the largest baghalahs, which are only 300 or 400 tons, carry 80 to 100 horses. From Persia carpets, dried fruit, almonds, rose-water, &c., are exported to India, but not in large quantities. Corn, mules, and asses are exported to the Mauritius from both Bu-shehr and Maskat, also salt and salt fish from the latter place. Shark-fins, &c., are also sent to India for the China market.

Imports are chiefly rice, also timber, English piece goods, indigo, iron, and lead, from India; sugar from Batavia and the Mauritius; coffee from the Red Sea.

Vessels. The number of square-rigged ships employed in the Gulf trade has decreased of late years. The opening of the Suez Canal has developed the steam traffic, which is rapidly increasing. A direct trade with England from Basrah is carried on, by some English merchants of Baghdad.

Communication. A bi-monthly steamer runs with the mail between Bombay and Basrah, calling at Karachi, Maskat, Bandar 'Abbas, and Bu-shehr. The communication between Bu-shehr and Baghdad is monthly, excepting in the hot months; a small sailing vessel takes the Residency mail to Basrah (passage varying from 5 to 10 days or more), and the armed steamer belonging to the British Government takes it thence to Baghdad. There is a private mail from Baghdad to Beirut on the Mediterranean, which is sometimes plundered by the Arabs.

Piracy. For the information of strangers, it may be stated that a piracy on a European vessel has been unknown for years.* No molestation need be anywhere apprehended by the smallest trader within the Persian Gulf or Gulf of Ohman, even if wrecked; except, in this case, such petty acts of pilfering as might occur anywhere. To the S. of Ras-al-Hed a vessel grounding would certainly be plundered by the Bedouin, who are the sole inhabitants, and under no human control.

NAVIGATION OF THE PERSIAN GULF.

General Observations. It may be laid down as a general rule that the passage up the Gulf is more difficult than down it. A ship should, if merely passing up and down the Gulf, keep entirely on the Persian coast; at the entrance the tides are very strong on the Arab side, and the rest of the Arab coast is fronted by extensive reefs, and is very low. Care is required in the navigation owing to the numerous islands and strong tides near the entrance, and to the frequency of strong breezes and bad weather (especially in winter), which set in without much, if any, warning; as also their liability to sudden shifts.

During shemals, especially in summer, and during the Nashi of the S. part of the Gulf in winter, the very hazy state of the atmosphere renders it impossible to see the land unless quite close; a stranger would never believe the haze to be so thick as it really is, and he might find himself quite close to the beach before seeing it.

Passages up the Persian Gulf. Vessels bound up the Gulf generally have occasion to call at Maskat; the following directions will serve whether they do so or not.

In the *fine season* the high land of the Arabian coast will generally be seen at great distances, especially at sunset. The mass of high land between Ras Abu Daood and Soor is that always made, an extent of 60 m. along the coast. The mountain Jebel Abu Daood will be the nearest, while over it are the higher mountains of Kerriyat (Jebel az Z'atari), having the great valley called by navigators the Devil's Gap between them, and the mountains called Jebel Beni Jabar. Jebel Abu Daood should bear S. to S.S.W. according to the distance off. As nothing will be gained by closing the Arabian coast until Maskat bears S.W. at least; if working up from the S., a ship should keep at a distance (perhaps 50 or 60 m.) from the coast. This is desirable to avoid the light airs and S.E. current experienced near the shore.

A remarkable saddle hill (1,340 ft.), the highest of the black hills near Maskat, and 2 m. S. by W. of that town, is a good mark for telling its whereabouts; it is very conspicuous when bearing W.N.W. to W.S.W. On a nearer approach, Fahl Islet will prevent a stranger passing the

* The attack on the mail steamer, *Cashmore*, off Basrah, in 1872, contradicts this.

place; and Jillali fort at Maskat is sometimes seen when bearing about W., showing white in the morning sun against the black hills behind. There is anchorage only in very deep water quite close to the shore from Maskat to Kerriyat, and thence to Soor often none at all. In the S.W. monsoon, a vessel should pass as close as convenient round Ras el Hadd, which is a low sandy point and deep-to; it is not probable owing to the hazy state of the air, that the high land would be seen till off Soor or Kalhat, and if the vessel were not pretty close in, it might not be seen at all. The high land may often become visible for a short time about sunset.

There is no difficulty in getting up to Maskat at this season, but if the cove were passed in the night, owing to a N.W. alongshore current in the S.W. monsoon, or through not being close enough in, it might be tedious getting down to it again. There is no danger whatever for a ship between Ras el Hadd and Maskat.

Maskat to the Entrance of the Gulf. Leaving Maskat for the Gulf with a fair wind, a course N.W. by N. for 146 m. will carry a vessel abreast of Ras el Kuh, and about 12 m. off it, and thence 60 m. further on a N.N.W. course to a position abreast of the great Quoin (Sellameh) and 5 m. distant from it. Remember that one flood-tide will advance you nearly 10 m. in the mouth of the Gulf; but an ebb-tide will retard you to the same amount, and, if catching the vessel on either bow, may set her over to either shore.

With a N.-Wester it would be preferable to stand well over to the Mekran and Persian shore and work up along it in preference to the Arabian side, where there would be a lee current and heavier swell. Besides, some of the islands of the Deimaniyeh group are very low, of even form and brown colour, and it would be better to avoid making them in bad weather, especially by night. They are deep-to on their N. side, so that the soundings would be little guide. In fine clear weather the mountains on both the Arab and Persian coasts (Jebel Nakhl and Jebel Shahu) may be seen at once when in the middle of the Gulf.

The Persian Coast is deep-to and safe to approach to the E. of Ras Jashk, but the shore is low, the hills being a considerable distance inland. It would not be desirable to approach it too closely, as it has been very imperfectly examined. The 100-fathom line is only 5 to 8 m. off the points Ras Zegin and Maidani. The Quoin hill, inland of Jashk, is a capital land-mark and conspicuous except from E.S.E.

The shore is very low on the whole of the Persian coast as far as Hormuz, excepting one or two small hills near the beach. It is deep-to, and deceptive as to the distance off, as the low shore is not seen farther than 4 or 5 m., at which time the appearance of the hills would lead one to imagine the vessel to be fully twice that distance from land. The lead is little guide unless kept going very quickly. Care must be taken in passing the shoal E. of Ras el Kuh, and the flat off Ras as Shir, or in standing in towards them in beating up. The land-mark Koh i Mubarek is conspicuous when seen from N.W. or S.E., but less so from abreast of it, when it is not so plainly visible against the light coloured hills behind; it is of light colour and only visible 18 m. Jebel Kurrye and Jebel Bees are remarkable, and visible quite across the straits from near Limeh.

Arabian Coast. In clear weather the great mountains of the Ruweis al Jebal will be seen abreast of Ras Jashk; they form in two principal peaks.

It is not advisable to stand over too close to the Arab coast in working to the N. from Ras el Kuh, though there are no dangers off it, as the wind is generally lost or becomes baffling under the mountains; the tides are very strong, especially N. of Uhm el Fiyarin, and the water too deep for anchoring. Uhm el Fiyarin generally shows light coloured against the mountains behind, and though a lofty islet, quite insignificant by comparison. The remarkable group commonly called the Quoins cannot be mistaken: the great Quoin is visible 27 m. Sailing vessels should not pass very close, or to the S. of them, unless with a strong fair wind; and even then, the breeze is seldom carried past these islands. The tide sets about N.W. and S.E. near them, and is very strong, with eddies and races to the S. of them.

Entrance of Gulf to Great Tumb. From Ras el Kuh round to Henjam Island the tides are strong quite across the sea, and have a material effect on the vessel's progress in short intervals of time. The two mountains Shemil and Ginnoh, at the back of Bunder Abbas, are seen in clear weather from near Uhm el Fiyarin. On rounding the Quoins, Larek will be seen making at first in a great many detached lumps; and if a working breeze, a good stretch over close to it should be made, it being safe to approach.

In light winds, vessels working in have been carried by the flood to the N.E. of Larek; and, it being dark, they did not find it out till they tacked, and made Larek on the starboard tack, close to. It is H. W. on F. and C. at Musendom about 10 h., but the stream of flood would flow three hours after H. W., and the stream of ebb as much after L. W.; from which data the direction of the stream, whether flood or ebb, may be roughly estimated.

Hormuz with its several white peaks, will be seen on the starboard bow as you stand towards Larek. The shemal blows here W.S.W. to S.W., and a vessel should not get too far over to the shore to S. and E. of Hormuz, which is a lee shore for that wind without any shelter. Hormuz or Kesm roads are good places of shelter if caught in the Strait in a heavy shemal. The water close to Larek is too deep for convenient anchorage.

Quoins to the Great Tumb. When the Great Quoin bears S., 5 m. distant, a course W. by S. for 67 m. will bring a vessel abreast of the Great Tumb Island, nearer the edge of the Basiduh flat than to the Island; but the course made good depends very much on the way the tides have set you, they should always therefore have the careful attention of the navigator.

The hills on El-Kishm Island are characterized by light colour, and remarkable table-topped and precipitous forms. Henjam is covered with irregular dark coloured hills, and when seen from the E. or W., has a remarkable gap or valley near the N. end. Between the Quoins and the Tumb, as the chart shows, the sea is clear for working quite across the Gulf. Henjam Sound affords good shelter against all winds. In approaching or standing over towards the flat off the S.W. end of El-Kishm, the lead must be kept going. The discoloured water will indicate its edge by day very clearly, although a vessel may stand some distance into the discolouration before shoaling her water. A look-out should be kept for fishing-boats at anchor on the edge of the flat. Jezirat Tumb (seen about 15 m. by day) is level, brown coloured, and does not show well at night; it is deep-to, except on the S. side, and has foul ground $\frac{1}{2}$ m. off the S.W. corner. From this island a departure is taken for entering Basiduh roads.

From the Tumb to Kais. When the Great Tumb bears S. about 5 m. distant, a course W. 43 m. and then W. $\frac{1}{2}$ N. 30 m., carries a vessel abreast of Kais Island. After passing the Tumb, the island of Nabyu Tanb (or Little Tumb) will be seen; it makes in two lumps (dark little peaks at N. end), is deep-to, and safe to approach. On the starboard bow, Jebel Bostaneh will be seen making like a high island. The course given above takes a vessel $1\frac{1}{2}$ m. N. of Faroor Island, and $5\frac{1}{4}$ m. from the shoal named after it. The island is a mass of dark volcanic peaks, visible 25 m.; it is quite deep-to all round, and may be passed quite close.

By keeping in 25 to 30 fathoms, a vessel will be clear of the shoal at night, and also of the island, if not seen. The depth increases to 50 and 44 fathoms towards Faroor, and decreases towards the shoal. The island shows well at night. The Yarid Hills, an isolated mass will be seen to the left of Bostaneh when bearing N.W. by W.; and before reaching Faroor, the grand land-mark, Jebel Taranji, or Charek Hill, a round-topped mountain, will be seen to the left of these hills; when you will be clear to the W. of Faroor shoal. This mountain is visible about 70 m.

El-Kais Island may be seen about 13 m., is of even form and similar in appearance to the Great Tumb, though much larger, and has a few trees on it. Its E. and W. points are low, and the island would be difficult to see by night. Deep water is carried close to the outer side, which should not be approached nearer than a mile. In working from the Tumb to Kais, it is as well in light winds to keep to the N. of the Tumbs, so that if the wind falls light and the tide be unfavourable, a vessel may be able to anchor. The lead is a safe guide approaching the Basiduh Flat, not so towards the Tumbs. If standing between the Tumbs, remember the tide sets E. and W. very strong, 2 to 3 m. per hour at springs.

The N.W. coast of 'Ohman, below Ras-el-Khaimah, is not visible at a greater distance than 6 or 8 m.—so that it is seldom made by vessels working up; it is quite free from danger as far as Ras Hasah, or lat. $24^{\circ} 55' N.$ During a shemal it is advisable to be in with the Persian coast by daybreak; as, if there is no land-wind, the N.-Wester always draws a few points off that coast about that time.

Bu Moosa Island, having a dark sugar-loaf hill, may be seen about 20 m.; the rest of the island is low with a few detached small dark hills. There is foul ground extending $\frac{1}{2}$ to $\frac{1}{4}$ m. from the beach. There is no objection to making a stretch to the S. of this island, if convenient; the lead is no guide approaching it. Sirry, or Seri, is low and has many hillocks on it, not visible more than 12 m., and has foul ground round it, except on the E. side to a distance of a $\frac{1}{4}$ to $\frac{1}{2}$ m. The lead is no guide.

Nabyu Faroor has a small dark saddle hill on the E. side, visible about 14 m., and a reef extends fully 1 m. off the N.W. corner. The lead is no guide.

If becalmed E. or W. of any of these islands, attention should be paid to the drift. If a strong N.-Wester sets in, a vessel may find shelter close in shore anywhere E. of Bostaneh, or in Moghu or Charek Bays, or in the bay on the E. side of El Kais. In N.-Westers, less sea will be found by working up near the Persian coast. A ship may stand quite close in at this part, except under Jebel Yarid, which has shoal water from 1 to $1\frac{1}{4}$ m. off it.

El-Kais to the Mutaf, or Berdistan Bank. When the island of Kais bears N. about 5 m.,

a course W.N.W. for 45 m. brings a vessel abreast of Sheikh Shuaib, and about 5 m. from it; and thence N.W. by W. $\frac{1}{4}$ W. 120 m., will take her past Ras Mutaf (in 13 to 15 fathoms) opposite Mokheileh Islet, and 11 m. off it.

Hinderabi is a island similar to Kais, and visible 13 m.; it has deep water close to the reef on the S. side, which has not been surveyed, and should not be approached nearer than $1\frac{1}{4}$ m.

Sheikh Shuaib is another island similar in appearance to the two last, but much larger; a large round tree on the highest part near the centre is conspicuous and has been taken for a sail. It is quite deep-to and safe to approach. The great land-marks, called by seamen Abslulh Notch and the Barn Hill, will be successively seen: they are each visible about 70 m., and cannot well be mistaken.

Soundings. To the S.S.E. of Ras Mutaf, and for a distance of 30 m., the sea is shoaler by fully 10 fathoms than it is nearer to the Persian coast, or to S.S.E. of Congoon Bay. A ship therefore in running up N.W. by W. from outside of Sheikh Shuaib, if she got soundings of 33 to 35 fathoms, after sixty miles run from that island, would know that she has been set to the W. of her course; whereas, when nearer to the Persian coast, she would have greater depths of 45 or 40 fathoms.

The bank, Ras Mutaf, will on this course be passed in 13 to 15 fathoms, a very safe depth; the muddy appearance of the water, which extends some miles outside the shoal, is a good indication of approach to it by day; when you may see Jebel Dreng, which makes in an even mass with scalloped top; when these scollops are in one, you are well past the shoal called Ras Mutaf. This mountain is seen 60 m. in clear weather.

Working from El-Kais to Ras Mutaf.—A vessel may work up either inside or outside Kais Island, as convenient. The main land is here very deep-to; a reef extends off the N. side of Kais about 1 m., on which you shoal quickly. There is no danger on the Sambarun shoal.

Working up outside.—The 20-fathom line on the edge of the pearl-banks is quite far enough to stand over; and there is nothing worthy of remark till past Sheikh Shuaib, when she must not stand farther than 30 or 35 m. from the island on the off-shore tack, on account of the **Shah Alum shoal**, in lat. $26^{\circ} 25' N.$, lon. $52^{\circ} 30' E.$ From the shoal the Persian mountains are nearly down, so that if the coast be high up above the horizon, a vessel cannot be near this danger. Hinderabi should not be approached within $1\frac{1}{4}$ m. on the S. side (as stated before). The lead is no guide passing either this island or Sheikh Shuaib; this latter is quite free from danger, and there are 45 fathoms only 2 m. from the island. If convenient, a vessel might work through between this island and the main, where there is anchoring ground and no danger.

If caught in a N.-Wester, Cheruh Bay, the anchorage off the E. end of Sheikh Shuaib, or Shiwuh, are convenient places of refuge. A vessel should not stand too close past the W. end of Sheikh Shuaib, on account of the flat off it. From Shiwuh to Tahri the coast is very bold, and no anchorage except quite close. Small vessels would find shelter in Nabend Bay, or Tahri, but very close-in, and much swell; the former place, especially, is not adapted for a vessel of any size. A vessel by making short tacks in-shore, would get up from Tahri to Ras Mutaf, when there would be too much sea outside. There is good shelter under this shoal. In working round this bank, off Ras Mutaf do not come under 11, or at night 12 fathoms.

From Ras Mutaf to Bu-Shehr. From the position 11 m. off Mokheileh Island in 14 fathoms, a course N.N.W. a little N. for 80 m. will take a vessel opposite Ras Shaghab, the W. low sandy point of Bu-Shehr peninsula, in 6 to 8 fathoms, when Bu-Shehr will be in sight to the N.E. The soundings will be 15 to 17 fathoms, decreasing to 12 off Ras Halileh; which depth will by night keep her clear of the very low sandy point Ras el Khan, and at a safe distance from the coast. Ras el Khan may be approached to 12 fathoms; it is sometimes nearly overflowed.

The Ass' Ears, (so called by seamen, but by the natives Bu Reyyal,) on the lower range near the coast, are very conspicuous; they are visible 45 m., forming in three little pinnacles. Over this range is seen the great mountain Kuh Khormuj, which, though it forms a very remarkable peak when bearing to the S. of E., has nothing striking in its appearance from the S.W., where it presents only a long convex ridge. On getting above the Ass' Ears, she should stand in to 10 fathoms, so as not to be too far out when wanting to make Ras Halileh.

The highest point on Bu-Shehr peninsula, a small white dome on the summit, at 5 m. to the S. of the town, is 150 ft. above sea, and visible 13 m.; the date-trees near Ras Halileh would be first seen, appearing like a low island. The peninsula is of even outline and light brown colour. Running up at night, a vessel should close Ras Halileh; by paying attention to the lead, she may stand into 6 (or even 5 fathoms, if necessary), until the land is seen, and run up along shore in that depth till about off the town, and then anchor. This will prevent her passing the place, and perhaps getting close-in to Ras as Shat, which is so low that it is nearly overflowed at H. W. Rockets or

blue lights would be answered if there were any vessel of war lying in the harbour. If so far out by day that the low land is not seen, the great bluff fall in the mountains near Gisakun is a useful mark: it bears N.E. $\frac{1}{2}$ E. when in one with the town, and is visible 70 m.

In working up from Ras Mutaf, a vessel may make tacks of about 45 m., so as not to approach **Rennie Shoal**, in lat. $27^{\circ} 8' N.$, lon. $50^{\circ} 42' E.$, or **Farsi and Arabi Islands**. These latter are low sandy islets, and deep-to, only visible 6 to 8 m. by day. (See also pages 249 and 254).

From Bu-Shehr to the River. When off Bu-Shehr in 5 fathoms, a course N.W. $\frac{1}{2}$ W. 28 m. leads to the anchorage off Kharg Fort, passing Ras as Shat, 3 m. off, in 10 fathoms. Khuwairij, or Khargu, is a mere sand-bank, with a reef extending $\frac{1}{2}$ m. off it, which has 10 to 16 fathoms close to it. Kharg, or Karak, is visible 17 m., and will be sighted soon after Bu-Shehr is quite below the horizon, but at night is often not seen till quite close, being of light brownish colour. It has a Quoin Hill at the N. end, a bluff at the S. end, and a small tomb on the highest part. The reef surrounding this island is nowhere $\frac{1}{2}$ m. from the shore, and has 7 or 8 fathoms quite close-to. Kuh-i-Bang, a bluff hill, is visible from Kharg, being not 30 m. to the N.

Working up to Kharg from Bu-Shehr calls for no special remark; the lead must be the guide standing into Ras as Shat. At Kharg, pilots are invariably taken on board, for the further prosecution of the voyage to the river. For remarks on the rest of the passage, see the special description (page 275.) These pilots may be implicitly trusted for the passage thither.

PASSAGES down the PERSIAN GULF. Kharg to Bu-Shehr. The direct courses and distances from Kharg to the S. being given in the passages up the Persian Gulf, it is not thought necessary to repeat them here; the reader can readily refer to them, and reverse the courses for the passage down. The remarks will be confined to points to which it is necessary to call attention exclusively for the passage down.

By night a vessel would steer half a point to the E. of the direct course, keeping the lead going on approaching Ras as Shat; and feel her way down along the outer banks of Bu-Shehr harbour till opposite the town, so as not to pass it. The flood-tide being on the starboard bow, would render great attention to the lead necessary, so as to haul out as the water shoaled.

Bu-Shehr to the S. A vessel should round Ras Mutaf as in the passage up, and thence shape a course to pass outside Sheikh Shuaib. The W. point of that island is very low and rocky, and not easily seen in thick weather or at night; vessels often find themselves while running down passing much closer to this island than they expected; perhaps the ebb setting towards the Strait inside the island may account for this indraught. This is now the more likely to happen, from an over anxiety to avoid the Shah Allum shoal.

In the event of a S.-Easter, it would not be advisable to stand into Nabend Bay for shelter, as, if a shemal followed, it would be almost impossible to get out. Nakhilu Bay is the best place for anchorage in a S.E. gale.

The W. points of Hinderabi and Kais are similar to that of Sheikh Shuaib. If running before a N.-Wester, the extreme haziness of the air renders it necessary to exercise the greatest caution in making or passing any of the islands, the lead being little guide, or generally none at all. Faroor is the easiest to see, as it is dark-coloured and high; there is also no reef, except off the W. side, where a small ledge projects a few hundred yards from the island.

Shelter might be obtained in a koss (S.-Easter), either in Charek or Moghu Bays, but you must either anchor well up these bays, where you would be sheltered in a shemal, or be ready to weigh at a moment's notice. Off Lingeh, and thence to the Basiduh Flat, there is never much sea in E. winds; doubtless that shoal flat breaks the force of the sea.

Henjam Sound is the next available anchorage. The Great Quoin is generally easily seen, even at night, but, if not seen, you are far enough to haul to the S., when you shoal to less than 40 fathoms, as you will then be past the Quoins. There is good anchorage behind Hormuz in a S.-Easter.

The coast of Batneh should be avoided; it is a lee shore in a N.-Easter, and in the summer the current sets to the N.W. along it. A vessel therefore leaving the gulf and being past the low point of Ras el Kuh, should shape a course for Maskat direct; or in the summer to the E. of the direct course, until Maskat bears S. In the S.W. monsoon the swell will be felt before reaching Maskat, rolling up from the S.E.; it is perceptible even off Ras el Kuh. If not intending to call at Maskat in this season, it will be well to be near lat. $24^{\circ} N.$ before opening Ras el Hadd, in case of having the wind hang at S. to S.S.E., with a heavy sea.

COAST OF BELOOCHISTAN.

CAPE JASHK—CHARBAR—GWETTER—GWADEL—ASTOLA ISLAND—ORMAHRA—HINGOR—RAS KOOCHREE
SONMIANI—CHURNA ISLAND—RAS MOOARI.

(VARIATION AT CAPE JASHK, 1° W.; AT RAS MOOARI, NO VARIATION.)

Beloochistan has two of its six provinces along the sea-board—viz., Mekran and Luz. Their coasts are arid and sterile, with sand hills and other rugged hills near the sea, and high mountains at the back, but all seem barren of trees or vegetation. Mud volcanoes are a peculiar feature at several places, and may be distinguished from the mountains they adjoin, like so many fungi or excrescences on the face of nature. The inhabitants are few, Beloochis and Brahuis, both Mohamedans. Of course the Banyan merchant is found at all important towns. The province of Mekran extends from Jashk to the Hingor River, from that place to the Hubb River (by Ras Mooari), is the Lus, or Luz Province, under the Jam of Beyla; and the Governor of Sonmiani, a lieutenant of the Jam, looks after the sea-board. There does not appear to be much trade; but, as the telegraph now runs along the Mekran coast, its capabilities may be developed, and perhaps Kedje, formerly spoken of as Kej-Mekran, about 100 m. inland of Gwadur, may again attain to the commercial importance it had in the days of Marco Polo, who says of its people, "They live by merchandize and industry, for they are professed traders and carry on much traffic by sea and land in all directions. And you must know that this Kingdom of Kesmecoran is the last in India as you go towards the West and North-west." There are now **Telegraph Stations** at Jashk, Charbar, Gwadur, Ras Pasni, Ormahra, and Sonmiani, as well as at Karaehi.

RAS JASHK, or CAPE JASK, in lat. 25° 38' N., lon. 57° 45' E., has been described at page 257. **Ras Zegin, or Cape Muksa**, bears from it E. by S. $\frac{1}{4}$ S., distant 16 m. It is a low point of land, having a sharp-peaked hill to the E. The shore between them is low, but high and uneven inland, where, 11 leagues inland, bearing N.N.E., the high mountain of Chouse or Shahu may be seen at 20 leagues' distance. On the W. side of this cape, the coast forms a large bay, with regular soundings, affording better shelter from N.-Westers, than Jask Bay. Within 3 m. of the point, the depths are 3 to 6 fathoms, and 3 leagues off, 70 to 120 fathoms, from whence the bank shelves off very abruptly to 130 fathoms, no ground.

Ras Maidani, or Mundanny, in lat. 25° 24' N., lon. 59° 6' E., and distant 17 $\frac{1}{4}$ leagues to E. by S. from Ras Zegin, has a reef projecting 2 $\frac{1}{4}$ m. from it, in a S.W. and W. direction, with soundings of 3 and 4 fathoms close to it, and 7 or 8 fathoms about 3 m. off, outside of which the chart shows the soundings to deepen suddenly to 50 fathoms. From Ras Mundanny to Ras Zegin the coast is generally low near the sea, consisting of jungle and swamp in some places. The soundings along the whole of the coast, from Charbar to Zegin, are regular near the shore, but a little to the E. of this cape, and in some other parts, the bank extends only a few leagues from the land. Shahu mountain is 55 m. to the N.W. of Ras Mundanny. **Khor Rabj** is an inlet, in lat. 25° 28' N., lon. 59° 15' E., capable of admitting only small vessels; its mouth is 12 m. to the E. of Ras Maidani. The coast to the E. of Khor Rabj, runs about E., curving to S.E., there forming the E. point of Rabj Bay, which is 27 m. to the E. of Ras Maidani. Further on to the E., at 15 m. from the last point, is **Ras Tank**, which has a small river of same name on its E. side, with two fathoms water at the entrance; but the soundings are very irregular and mostly hard sand. About 3 m. up the river, there are said to be the ruins of a Portuguese fort, with some wells. Ras Tank has a reef of rocks extending W. and N.W. to the distance of 3 m. from its W. side. A little way inland, to the W.N.W. of Ras Tank, is situated the high land of Koh-i Kalat, or Coelat, which is high and remarkable. Rabj is sometimes written Rabbaj and Rapch.

RAS GODEIM, in lat. 25° 19' N., lon. 60° 10' E., at 17 m. to the E. of Ras Tank, or 5 $\frac{1}{4}$ leagues to the W. of Ras Koolab, is the W. extreme, visible from the latter place, and forms the S.W. side of Possem or Fuzzem Bay. It appears, when first seen, like an island, and is a headland, level at the top, with steep cliffs towards the sea, the contiguous land being very low. The coast from **Ras Koolab** (which is 7 m. to the W. of Ras Charbar), is of moderate height, till it terminates in a remarkable bluff, called Ras Fuzzem, the E. extremity of Possem Bay, in which the depths decrease from 5 or 6 fathoms at the entrance, quickly to 2 and 3 fathoms inside. About 2 m. S.E. from the W. point of the bay, there is a rock nearly even with the water's edge, having 7 fathoms near it all round, and a rocky spit projects from Ras Godeim to the S. The land round Possem Bay is low, but inland there are some craggy hills of considerable height. The coast from Ras Maidani to Ras Fuzzem is under the chief of Gaih; whilst from Zegin to Bunder Abbas is farmed by the Seyyid of Maskat.

CHARBAR, or CHOUBAR BAY, is of a circular form, nearly 3 leagues in diameter, and Ras Charbar, its E. point, is in lat. $25^{\circ} 16' N.$, lon. $60^{\circ} 36' E.$ This bay is one of the best on the coast, and is about 15 leagues to the W. of Gwetter Bay; the entrance is between Koolab, or Meledam Point, on the W. side, and the low point Ras Charbar on the E. The town, composed of straggling mat houses, stands near the low point, and near it a white tomb and some trees, which in approaching are perceived sooner than the town. Koolab high point may be passed within a moderate distance when entering the bay, it being safe to approach, where ships may anchor in 4 or 5 fathoms, with the point bearing S., and $1\frac{1}{2}$ m. off. Fresh water of good quality is easily procured, being near the shore; wood is scarce and expensive, being brought from the interior on camels; bullocks, goats, and sheep may be obtained, but poultry are scarce. Some small gardens produce turnips, onions, potatoes, carrots, brinjalls, &c. They have very fine horses, and a few camels. This town, although very indifferent, is the best on the coast; several Banians are settled here, and the inhabitants, like those of Gwadel, are mostly weavers. There is now a **Telegraph Station** at Charbar. The town was in possession of the Maskat Arabs till March, 1872, when it was captured by the Persians. It is called **Sharbar** by the Arabs.

Farther up the bay, on the same side, are the ruins of the town of Tiez, or Tearsa, where the Portuguese had formerly a settlement. From this place round the bay to Point Koolab, the land is very low and covered with shrubs, but the country hereabout is generally dry, barren, and unfruitful, seldom having the benefit of rain. Famines, therefore, are liable to happen, which force the inhabitants in great numbers to desert the country. The small bay where the town of Charbar is situated, has regular soundings with sandy bottom. To the N. of Ras Tiez, the depths decrease quickly N.W. of the point for $3\frac{1}{2}$ m. to 15 and 9 ft., on an extensive rocky bank, fronting the E. side of the bay; but the soundings are regular near the head and on the W. side, where there is good shelter under Koolab headland from W. winds, which sometimes blow very strong.

Ras Charbar, or Choubar, in lat. $25^{\circ} 16' N.$, lon. $60^{\circ} 36' E.$, (the tomb at its extremity), is a rocky point of slight elevation, nearly steep-to, having 3 to 5 fathoms within 50 yards of its S. side, and 4 fathoms in the bay to the N. at $\frac{1}{4}$ m. off shore. The coast to the E., near the sea, is steep and rocky, with a few small sandy bays for 6 m., where it joins the steep clay cliffs of Mis-kani, fronting which there is a sandy beach, which continues with here and there a rocky point to **Ras Keinj**, in lon. $60^{\circ} 46' E.$, from Ras Charbar this cape appears like a peak, sloping irregularly and ending in a bluff. Off Ras Keinj, is a gut in the land, which (tradition says), was once a creek, and is still called Khor Keinj by Beloochis.

The Coast to E. of Khor Keinj is low near the sea, with the high, bluff, craggy cliffs of Karki-Koi, or Koi-Karki, a considerable distance inland; fronting which, within a league of the sea, are the clay cliffs of Pat-Koi, which continue in irregular peaks to **Ras Brees**, in lat. $25^{\circ} 6' N.$, lon. $61^{\circ} 9' E.$, a perpendicular cliff of moderate elevation, composed of clay; a small bay is formed to the W. and N. of the cape, where a few fishers' huts are situated, but this bay has not been sounded. To the E. of Ras Brees, steep cliffs with sandy beach in front continue for 4 m., when the coast becomes low, with a few remarkable hillocks, till it joins Ras Pashoot, a bluff cape of steep cliffs with a table-top, extending out but a short way; and the same cliffs continue to Ras Farsah. The soundings off this coast are regular, 5 or 6 fathoms at 1 m., and 10 fathoms at 2 m.; clay bottom outside 5 fathoms, but sand and rock in patches inside.

Ras Farsah, in lat. $25^{\circ} 3' N.$, lon. $61^{\circ} 24' E.$, is a prominent cape of slight elevation, similar to Ras Brees and Pashoot. To the E.N.E. of the cape, is a small rocky island, between which and the main is an anchorage for small vessels called **Ras Farsah Bunder**, where the natives go for fish, and good shelter may be had from S.W. and W. winds; the bay is upwards of a mile in depth, and 4 fathoms at L. W. may be had with the Ras bearing S.W., and the island S.E. by E. A vessel running in should keep in mid-channel, or if anything, borrow on the cape, for a small rocky spit runs off the island. The soundings between cape and island are 4 to 6 fathoms, with overfalls of $1\frac{1}{2}$ fathoms sometimes, the bottom rocks, sand, and mud; but at the anchorage, they are regular with muddy bottom only.

GWETTER BAY, or DUHET GWETTER, is about 3 leagues deep and 5 leagues wide at the entrance, where the depths are 6 or 7 fathoms, shoaling to 4, 3, and 2 fathoms near the shores. Ras Farsah is the W. point, and bears W. $\frac{1}{4}$ N. 15 m. from **Ras Joonee**, which is in lat. $25^{\circ} 2' N.$, lon. $61^{\circ} 40' E.$, and forms the E. point of the bay; when off the latter, no land on the W. side of the bay is discernible, except a hummock or two, which appear like islands. The land at the head of the bay, being very low and covered with shrubs, is not seen till within a few miles of it, and then the bushes first appear. Ras Joonee appears from every position as a steep bluff with perpendicular sides, and is of greater elevation than Ras Farsah. The soundings in Duhet Gwetter are very regular, with muddy bottom, and a vessel may anchor

where she pleases, except off Ras Joonee, where a reef of rocks extends about $\frac{1}{2}$ m. off shore, running to the N. for nearly 3 m. But little shelter, however, is found here, the bay being so wide; even in a common sea-breeze a good swell rolls in, so that Ras Farsah Bunder is always most suitable for a small vessel. Joonee is sometimes written Jewnee.

The Plateau of Shoal Soundings (what is commonly called *Pilot water*), extends further off shore abreast of Duhet Gwetter than at any other part of this coast. Depths of 10 fathoms are found at 8 to 11 m. to the S. by W. of Ras Joonee, and at 12 m. to the S. by E. of Ras Farsah; and 12 and 13 fathoms are found at 5 m. further to seaward. Outside and to the S.W. of this shoal water, the descent of the plateau is very abrupt, sheer down to 260 fathoms at the distance of only 2 m. from the 11 fathoms; and 500 fathoms at 6 or 7 m. further to the W.

Off Ras Gwadur, soundings cannot be obtained with the hand-lead beyond a distance of 4 or 5 m.; off Ras Shemal-Bunder and Ras Pussnee at about 9 or 10 m. Off Astola Island, the Webb Bank (3 fathoms) is at the verge of shoal water, therefore vessels should be cautious in approaching the island on a bearing between N. and N.W.

Gwetter Village is at the N.W. side of the bay, and Joonee Village about $2\frac{1}{2}$ m. within the point of this name on the E. side, the shore between them being fronted by a reef. Gwetter is small, with about 60 mat huts, and a rudely constructed square tower for its protection, built on the banks of a creek, affording good shelter for their fishing-boats; the bar has about 4 ft. at L. W., with 4 or 5 fathoms inside. The tower bears N.W. by W. from Ras Joonee. The E. boundary of Persian territory is a creek at 8 m. to E. of Gwetter.

From Ras Farsah to Charbar a vessel should keep near the shore, which is safe to approach, that she may anchor if it fall calm between the land and sea-breezes, to prevent being driven to the E. by the current, which prevails for 9 months of the year. Off this part of the coast the bank of soundings extends from 8 to 10 m., but the depths are regular in keeping along shore, and the bottom mostly sand or ooze. The current in January was found to set 2 knots per hour to the E., but much stronger out than in shore.

The Coast from Ras Joonee runs with steep cliffs to the E., for $2\frac{1}{2}$ m. to the Kataghur Bluff, from which a low point runs out called **Ras Garian**; thence to Ras Ghuns, it forms a slight concave with hills near the beach. Overfalls of 2 fathoms at a cast occur in the soundings off this headland; but there is no danger, the soundings are deep, and vessels may approach within $1\frac{1}{2}$ m. of the shore. At 8 m. to the E. of Joonee, stands Ras Ghuns, a high bluff cape, to the N. and E. of which lies **Bunder Ghuns**, a small bay, sheltering from W. winds, but open to E.; then the coast forms concave for 14 m. to E. by N. to **Ras Pishkal**, a rocky point of slight elevation, off which a rocky spit extends about 3 cables. Ras Pishkal forms the W. boundary of the W. Bay of Gwadur, called **Padee Zhur**, or the *Back Waters*, in contradistinction to the E. Bay of Gwadur, which is **Demeo Zhur**, or the *Front Waters* of Gwadur.

Padee Zhur Bay is about 7 m. deep, and the entrance is 9 m. between the points, so a good swell rolls in, but Ras Pishkal affords shelter from W. and S.W. winds in 5 or 6 fathoms, mud; off shore about $1\frac{1}{2}$ m., several straggling fishers' huts are seen on the W. shore of this bay. On the opposite side Ras Gwadur affords protection against E. winds, if a vessel anchors about 1 m. to the N. of the point in 5 or 6 fathoms; this anchorage will be about 2 m. to the W. of Gwadur town. There is a remarkable Notch or Cleft in the mountain a few miles inland, and directly N. from the bottom of this bay. The coast is of moderate height, but the interior hereabout is rugged. The soundings being usually regular over a bottom of mud, render the shore safe to approach, with common prudence.

Tides. It is H. W. on F. and C. at 10 h. 30 m.; rise and fall 10 ft. Flood tide outside, and all along the coast, setting to E., very strong at springs.

GWADUR, or GWADEL BAY, or Demeo Zhur, is sheltered from S.W., W., and N. winds; the bottom is chiefly sand, free from danger, and the depths, from 10 to 12 fathoms at the entrance decrease with tolerable regularity into the bay, where the water shoals from 6, to 5, 4, and 3 fathoms. Off Ras Nao, the current in January was found to set to the E., and so it continues till Oct.; it is very strong from May till Sept.

Ras Nao, or Nao (Cape Gwadel), the S.W. point of Gwadel Bay, is in lat. $25^{\circ} 4' N.$, lon. $62^{\circ} 19' E.$ It forms a peninsula of moderate height, 6 m. in length, E.S.E. and W.N.W., which is joined to the main by a neck of land 900 yards across. Ras Kameti, a low rocky point, is the W. extreme of this cape. Ras Nao is the E. point, a bluff cape of moderate elevation, composed of clay. Steep cliffs with small projecting points form the seaward face of Ras Gwadur.

Gwadur Town had formerly a wall fortified with towers, extending across the isthmus, to protect the town from assaults by land; the ruins of which, also of some wells, and of a town built with stone, are to be seen; but the few inhabitants now live in a town composed of huts of mats

and cadjans on the N. side of the cape. This town had about 500 huts closely huddled together, and in their centre a square fort with a tower at each angle, mounted with a few old pieces of cannon; the tower is miserably built and much decayed. The population is very considerable, composed principally of Beloochis and Banyans; the former almost all fishermen, the latter are merchants in the Bazaar. The Sheikh is a servant of the Imaum of Muscat, to whose government the town is subject, as indeed were nearly all places situated between it and Cape Jask. The Custom House (as at Maskat and Zanzibar) is farmed by a Banyan, who pays annually 3000 German crowns. The principal exports are ghee and dried fish; amongst the latter an immense quantity of shark-fins (these fish are very numerous along this coast), are sent to Muscat, and thence to Bombay for the China trade; quantities of other kinds are sent into the interior on camels, in barter for other articles. Imports are very small, principally rice. There is now a **Telegraph Station** here, and a Political Agent of the Indian Government.

Water is got here in the same manner as at Pussnee and Sonmiani, taking care to fill the casks at L. W., otherwise it is brackish; that procured from the built wells being brackish. A few goats, good sheep, and a few fowls may be purchased. The natives are mostly employed in manufacturing dark narrow checks, and some plain carpets of various colours. From Karachi to this place, the people call themselves Beloochis, or natives of Beloochistan, and from hence to Cape Jask they take the name of Brahuis, although their manners and dress appear similar, but in language they seem to differ a little.

The **Coast** trends to N.E. from Gwadur, 8 m. to Jebel Soor, a wall-like abrupt cliff, jutting into the ocean. Jebel Maidee, nearly 500 ft. above sea, and of white clay, stands to the W. of Soor and to N. of Gwadur; it was called formerly Muddy or Clay Peak, is very high, of a white colour, and may be seen at a great distance; it is a very conspicuous piece of land, and an excellent mark for this part of the coast. Two mounts named the Barn and Funnel, lie 11 and 8 m. inland, to the N.E. of Gwadel Bay, forming part of the high land of Durram. The soundings are regular along the coast, the bottom usually mud, or black sand and clay. Khor Barumba and Khor Khurwat are creeks situated 5 or 6 m. to the E. of Ras Soor. **Ras Koppah** is a high bluff table-land projecting very little into sea; and may be approached quite close, having 3 fathoms at 3 cable lengths off shore. From Koppah to Ras Shaid, or Shadid, the coast is steep clay cliffs the whole way, 11 m., and Savuru River lies midway.

Ras Shemal Bunder is a bluff irregular cape, about 40 m. to E. by N. of Ras Gwadur: it forms the W. point of an anchorage which affords good shelter to small vessels against N.W. winds (hence the name), and is at all times during the fishing season frequented by a number of boats which anchor close in and lie in smooth water after their daily labours. A reef of rocks projects off 1 m. from the cape, so that a vessel should not go nearer than 5 or 6 fathoms, as it shoals suddenly. From this anchorage, Jebel Zarain, the high part of Ras Pussnee, appears like an island, owing to the lowness of the adjacent land to the N. of it.

Ras Pasni, Pussnee, or Passeenee, in lat. $25^{\circ} 11' N.$, lon. $63^{\circ} 25' E.$, bearing E. 22 m. from Shemal Bunder, and $6\frac{1}{4}$ leagues to the W. by N. of Astola Island, is a bluff sloping cape of moderate elevation, appearing like a barn in coming from the E., and forms a deep bay on its E. side, where a village of the same name as the cape is situated, chiefly inhabited by fishermen. Water is procured here in the same manner as at Sonmiani, and a few lean goats may be obtained at a high price. Jebel Zarain, the highest part of Pussnee Cape, is some 300 or 400 ft. elevation, and appears, when viewed from the E. or the W., like the top of a barn, but more irregular and broken, and considerably longer when seen from the S. There is a **Telegraph Station** here.

After passing Cape Passnee, when steering to the W., the bluff point **Ras Sheid** is seen situated in lat. $25^{\circ} 12' N.$, lon. $62^{\circ} 53' E.$, which forms the W. extreme, and appears like an island, the high land of Durram at the same time showing like another island. Between the former and Ras Sheid, the coast is low and concave, appearing like a deep bay until closely approached. Pasni or Pussnee Village situated 6 m. to N. of Jebel Zarain, has about 80 huts, of cadjan palm-leaves and mats, with a square mud wall and two mud towers for its protection; the population may be from 150 to 200, who gain their livelihood principally by making mats, which they export to Karachi and sell to great advantage. A small shallow creek, called Shadi Khor, has its mouth a little to N.E. of the town, and runs inland in a N. direction between the Chakooli hills on the W., and the Noonaro hills on its E. side.

ASTOLA ISLAND, Haptalah, Haftola, Sataluh, or Sungadeep, in lat. $25^{\circ} 7' N.$, lon. $63^{\circ} 47' E.$ (the W. end), bearing W. 13 leagues from Cape Arubah, and E. by S. 19 m. from Ras Pussnee, is $2\frac{1}{4}$ m. long E. and W., of moderate height, and even appearance, having at 2 m. distance on the S. side a rock (20 ft. high) resembling a boat under sail when seen at a distance, between which and the island there are soundings from 4 to 7 fathoms, and overfalls from 9 to 18

fathoms, to the distance of 2 leagues outside the rock. On the N. side of the island there are two or three sandy bays, supplying great quantities of turtle, and shoals of sand project 1 and $1\frac{1}{2}$ m. from it on that side: between it and the main the channel is safe, about $2\frac{1}{2}$ leagues broad, with regular soundings from 5 to 8 fathoms. To the N.E. of the island, on the main, is the river Khor Kalmat, which will hardly admit a small boat; the bar at the entrance being very shoal, with only 4 or 5 ft. at L.W., but there is a depth of 5 or 6 fathoms inside. The coast hereabout is craggy and uneven, without anything remarkable. **Astola** is 4,500 yards long, E. and W., and 1,200 yards at broadest part; its E. bluff is 238 ft. above the sea: its W. or highest part is 270 ft., and on a clear day it may be seen from a vessel's deck at 5 or 6 leagues. It has bluff perpendicular cliffs nearly all round, composed of clay with a rocky surface. Two small sandy bays are situated below the cliffs on the N. side near the W. point, and one small sandy point towards the E. end on the same side, all frequented by numerous turtle. On its S. side, it has several small rocks separated from the island but close; the **Sail Rock** bears S.W. by S., and 2,700 yards distant from the E. end. Two small sandy shoals lie off its N. side to the distance of $1\frac{1}{2}$ m.; they have $1\frac{1}{2}$ fathoms at L.W., with 3 and 4 fathoms between them and the island; another lies $1\frac{1}{2}$ m. to the N.E. of the E. end of the island, with not less than two fathoms at L.W.

Webb Bank is a shoal, lying to S. of, and parallel with the length of Astola Island, about $3\frac{1}{2}$ m. off its E. end; on a S.S.E. bearing from that end the depth is $3\frac{1}{2}$ fathoms and probably less (3 fathoms); outside of that it deepens rapidly. The 100-fathoms line runs about 12 m. to the S. of Astola.

Overfalls of 3 or 4 fathoms at a cast are found off the S. side of Astola, and these extend to a distance of fully 6 m. Between the island and the main you have some irregular soundings, bottom either rock, sand, or mud, in different parts, till within 5 m. of shore, when they become shoal, and 4 fathoms are found at the distance of 5 or perhaps 6 m. to the S. by W. of Khor Kalmut. The coast hereabouts near the sea is extremely low, with jungle (probably mangroves) in some parts, so low as scarcely to be seen from the deck of a vessel lying in $4\frac{1}{2}$ fathoms water. The Talar hills stand to the N. of Khor Kalmut, about 12 m. from sea.

Tides. It is H. W. on F. and C. of Moon at 10 h. 45 m.; the rise and fall is about 10 ft. extreme. Variation of compass is too little to require notice.

Ras Bussool, at 9 m. to E. by S. of Khor Kalmat, is a bluff rocky cape, the W. extreme of the high and rugged land of Bussool, to the N. of which the river of that name falls into the sea. **Ras Sikunni** is the E. extreme of this land (the sea-face of which is 12 m. long), and it forms the W. point of the **Padee Zhur Bay**, or Back Bay of Ormahra, which is a cape very similar to Gwador, with bays on either side, affording shelter from either E. or W. winds. The soundings from Astola to Ras Arubah are shoal, but pretty even, or about 8 or 9 fathoms; you will get no soundings at 8 m. to the S. of Arubah headland.

RAS ARUBAH, or ORMAHRA (Captain Haines calls it Orimarrah), in lat. $25^{\circ} 7\frac{1}{2}'$ N., lon. $64^{\circ} 32'$ E., may be seen from Ras Malan, appearing like an island, it being a peninsula projecting far into the sea, forming a large bay on each side. That on the E. side, called Demee Zhur, or Front Bay, is safe, having regular depths of 6 and 7 fathoms, decreasing to 3 and 4 fathoms near the shore, with a rivulet called Khor Gorad, or Jerkamutty, a little to the E. The bay on the W. side, or Padee Zhur, has shoal water and is destitute of shelter from S. and W. winds, but preferable to the other in Dec., and January. The land about it is very remarkable, and for 4 or 5 leagues to the W. craggy and uneven. Ras Ormahra has considerable elevation, being at its N.W. side more than 800 ft. above sea. Its seaward face is 7 m. long, and runs E.N.E. and W.S.W.; its W. extreme being in lat. $25^{\circ} 8'$ N., lon. $64^{\circ} 34'$ E. Ormahra is now a **Telegraph Station**, from which messages may be sent.

The Town of Ormahra, situated under the steep cliffs on the N. side of this headland, where the sandy isthmus joins it, is small, composed of about 300 huts of mat and cadjan, with a ruinous fort mounting five pieces of cannon. The population is about 800 or 900, the language spoken is Beloochi; the Sheikh, or Jedgah, is subject to the Governor of Sonmiahni. Supplies of all kinds are scarce. Exports are fish and mats. Colonel Goldsmid, in mid-Jan., 1862, experienced a heavy storm of wind and rain from the E. quarter, at Ormahra, and he states that the sand isthmus on which the town is built, was nearly cut through by a new formed channel. This shows the danger of lying at anchor in these bays in the height of the N.E. monsoon (say Dec. and Jan.), when sudden E. gales may be expected. On the other hand from Feb. the W. winds commence, and then the W. bays of this coast are unsafe for small vessels. In Demee Zhur Bay, along the curve of the shore past the town to about half-way to Khor Gorad, the beach dries off at L. W. for nearly 1 m., thus making landing at such times inconvenient. **Khor Gorad** is a shallow creek, the mouth of which is 10 m. to N.E. of the E. cape of Ras Ormahra. The mud volcanoes of Chundra Goop lie to the W. of Khor Gorad.

The Coast from Khor Gorad is low for 5 or 6 m. to the E., then hilly with steep cliffs to **Ras Malan**, in lon. $65^{\circ} 8' E.$, which is a perpendicular bluff (as viewed from Ormahra), its highest part is called Butt Hill; a bay forms to the E. of it, and on the E. side of that is Jebel Upp, or Hubb, and beyond it the Hingor River. **Khor Butt** is a small stream running into the sea along the W. side of Butt Hill, through a break in the high ground.

The Coast Hills, at a few miles inland, seem to lie in ranges nearly parallel with the coast-line. The Talar hills are at the N. of Bussool River, and to the E. of it are the Gorad hills, of which the E. and highest part (about 2,000 ft.) called **Gorangutti**, stands about 20 m. to the N. of Ras Malan; there is a mass of hills between this and Jebel Hubb. **Nanee**, or **Hinglaj Hill** (about 1,800 ft.), stands to the N. of Jebel Hubb, and to the E. of both these hills flows the **Hingor River**, or Khor Hingool, the mouth of which is in lat. $25^{\circ} 20' N.$, lon. $65^{\circ} 30' E.$

Chardo Rocks, or Jezirat Chardo, at 6 m. to the E. of Khor Hingool, are situated close to the shore; they are more elevated than the coast behind them; the W. one is in lat. $25^{\circ} 20\frac{1}{2}' N.$, lon. $65^{\circ} 36' E.$ To the E. of them, about 5 m., is a small oblong hill near the beach, called Jebel Goran, or Gorab, looking like an island from a distance. A shoal bank of $3\frac{1}{2}$ fathoms lies off shore at $3\frac{1}{2}$ m. to S.S.E. of Jebel Goran, and there are overfalls (of 2 fathoms at a cast) in the soundings between this and the Chardo Rocks; otherwise the depths seem regular off this coast. The line of 20 fathoms projects fully 20 m. to the S. of Jebel Goran. Working along this coast it is very safe not to come under 20 fathoms at night.

RAS KOOCHREE, or **KUTCHERIE**, in lat. $25^{\circ} 22' N.$, lon. $65^{\circ} 43' E.$, is a bluff cape of moderate elevation, with a salt marsh at the back of its hills about 5 or 6 m. from the sea, and beyond that stands the great Haro hilly range, nearly parallel with the coast and 10 m. from it. More mud volcanoes are found to the E. of Ras Koochree, between it and the Phor or Poori Creek; these are also called Chundragoop, but Captain Haines gives the name of Deria Chuni to the largest. The mouth of Phor Creek is 8 or 9 m. to the E. of Ras Koochree.

The Coast thence runs to the E. $\frac{1}{2}$ N. for some 18 m., there forming the bottom of a bay, from which it trends to the S.E. for about 7 m., then to E. for a like distance, where it forms the W. point of Sonmiani Bay. The **Haro hills**, attaining an elevation of some 1,500 or 2,000 ft., stand 20 m. to the N.E. of Ras Koochree; they are about 30 m. to the N.W. by W. of Sonmiani, and the intervening country is much lower than other parts of this coast, the sea-shore is low and sandy with jungle in parts. The soundings decrease regularly towards the shore, being 7 or 8 fathoms at 6 or 7 m. off. By night a vessel should not shoal under 15 fathoms, unless bound to Sonmiani.

Soundings near Sonmiani. A vessel approaching this place from the S., should make Ras Muari; after passing which and Churna Island, she should steer N.; or, if with a foul wind, work in from 20 to 10 fathoms, as there is a sunken rock which lies 8 or 9 m. to N.N.E. of Churna Island, and this rock is in the line of 8 fathoms. Near Sonmiani she should not come under 6 fathoms, at L. W., when approaching some sand-hills of greater elevation than the shore in general, as there is no guide for the entrance if the weather is at all thick, which is likely if the wind be from N.E.; the breakers on the shoals near the bar are the first warning of approach in thick weather, and you come upon them suddenly from 5 fathoms. If there is any wind from seaward, with the ebb tide, you cannot mistake the bar, for the surf is great, and it is the only part of the coast where danger extends so far out.

If a clear day, there is a large gap in the distant high land (the Pubb mountains) which bears from the town N.E. $\frac{1}{2}$ N. this in one with a white mosque of Sonmiani, is a good mark for anchorage outside the bar, in 6 and 7 fathoms, mud, at 7 m. off the town; from this Ras Muari will bear about S. by E. $\frac{1}{2}$ E., and Churna Island (seen from aloft), S. by E. Wishing to communicate with the shore your boat may run to the E. round the breakers, and up to the town creek, but at first you had better employ a native boat.

SONMEANY, or **SOONMIANEE**, pronounced Soonmiahni, is a small town of huts, constructed with mats and poles, situated near the mouth of the Vindore and Poorally Rivers, which is scarcely seen from the road; but in clear weather the place may be known by a remarkable gap in the high land which cannot escape notice. There are 2 fathoms on the bar at L. W., with 5 or 6 fathoms where the boats are sheltered inside. Lat. of E. entrance $25^{\circ} 22' N.$, lon. $66^{\circ} 33' E.$ H. W. on F. and C. at 10 h., rise at springs 9 ft.

The Town is between the two creeks mentioned; it is populous with no fortifications for its defence. Belonging to this port are several large and small dingies and a good number of fishing boats. The inhabitants are principally Beloochis, whilst the trade is in the hands of Banyans. The Sheikh, or Jedgah, or Governor, exercises a quasi control along the line of coast from Hubb

River to Hingor, and even Ormahra. Every article of refreshment is here very scarce; even the water, which is indifferent, cannot be procured in sufficient quantity, nor without considerable trouble. It is got by digging holes 3 or 4 ft. deep, a little above high-water mark, and should be drawn off immediately. If the water oozes through the sand, which does not always happen, it will serve that day, and perhaps the next but soon becomes brackish. At Sonmiani there has now been made a **Telegraph Station**, but Karachi is much more convenient for sending messages.

From Sonmeany River, the coast takes a direction nearly W. $\frac{1}{2}$ S. 34 leagues to Ras Ormahra, and is safe to approach by the lead: there are several villages in the intermediate space. It is low near the sea to the W. of Sonmeany, but high and craggy inland, and continues so to Kutcherie, which is 14 leagues off. To the E. of Kutcherie there is a place called Arrah; between them, in a kind of valley, a mound of high white land is situated, a good mark for this part of the coast.

The coast from the E. point of Sonmeany Creek, takes a S.E. direction for 13 m., low and sandy the whole way, with the Pubb mountains about a dozen miles off. From the bottom of the bay, where the Lakh Bedok Pass emerges upon the sea-shore, the coast is irregular with rocky points, runs to the S.S.W. for 9 or 10 m. to a rocky islet called Kuh Churna, at the extremity of a small sandy point. At $\frac{1}{2}$ m. off this to W., there is a small **rock awash**, at H. W., on which the surf breaks high; between it and the main, you have 4 to 6 fathoms, and outside at 1 m. there are 9 and 10 fathoms. From Kuh Churna, the coast runs about S. for 8 m. to Hubb River entrance; this river is the boundary line of the British dominions.

Churna Island, or Chilna, in lat. $24^{\circ} 53' N.$, lon. $66^{\circ} 35' E.$, though of small extent, is rather high, being 340 ft. above the sea; it lies 5 m. to N.W. by N. from Ras Muari, with deep water between them, but a vessel should keep nearest to the island, as the shoals off the mouth of Hubb River extend 2 m. off shore. A vessel would find tolerable anchorage to leeward of Churna.

RAS MOVARI, or MOOAREE (so called by Sindians, but **RAS JILL** by Beloochis, and **Cape Mons** by former navigators), in lat. $24^{\circ} 50' N.$, lon. $66^{\circ} 38' E.$, is a prominent cape, of moderate height; forming, when viewed from either N. or S., as a gradual sloping bluff, with a low rocky point, having a bank projecting $2\frac{1}{2}$ m. from it on the S. and S.W. side, with depths of 3 to 5 fathoms rocky ground. The channel between it and Churna having 6 and 7 fathoms, is about a mile wide, between it and the bank that lines the coast. From Ras Mooaree to Sonmeany River, the distance is $11\frac{1}{2}$ leagues, and the direction of the coast nearly N., forming a bay; it is low close to the sea, and high inland, with tolerably regular soundings off it, chiefly mud. The high part of Ras Movari is 1,200 ft. above the sea, and Jebel Pubh to the N. of it, is about 2,500 ft.; so these two ranges, which have the Hubb River between them, are excellent land-marks for making Karachi during the S. W. monsoon. No vessel should round Ras Movari in less than 15 fathoms, as shoals lie off, and it has not been thoroughly surveyed.

COINS, WEIGHTS, AND MEASURES OF PERSIAN GULF.

The current coin in Persia is the keran, a silver coin, of which (according to the Indian Government assay) 209 are worth 100 Indian rupees (say £10 sterling), or one keran is about $11\frac{1}{4}$ d. the toman (gold) is worth 10 kerans. Of the subordinate copper coins (guz) 50 are equal to one keran. There is no national Arabian coinage, the current money is the Spanish or German dollar, worth about 4s. 6d. The Government rate of exchange is 100 dollars to 217 Indian rupees (about £21 14s. sterling) but varies from 212 to 225. The copper coins used are the "pice" of the Government of India, which pass at Maskat at a nominal value, which fluctuates according to supply and demand. The Indian rupee will, however, pass current everywhere (perhaps at a small loss). Ships should be provided with it, or be able to draw bills on Bombay, which are generally at a premium in Abu-shehr. English gold is not yet much known.

The standard of weight is called a maund, and varies considerably; at Maskat a maund of $25\frac{1}{2}$ lbs. is used, at Abu-shehr the common maund is $7\frac{1}{2}$ lbs., and a Hashim maund 116 lbs. Every town has a different maund.

The liquid measure is the English gallon, which is understood at Abu-shehr, Basiduh, and where they are accustomed to English vessels. Water is charged so much per cask, the price varies from one keran per water-cask of 50 gallons (hogshead) to $2\frac{1}{2}$, according to the distance it has to be brought.

The Arabs have very vague ideas about distance; there appears to be no Arab measure of distance corresponding to a mile or league, the only approach to it is what they call a zamm, which varies according to the ideas of the person using it. It may be from 7 to 10 miles. The Arabs give a definition to the effect that it is the distance at which a ship may be seen. Distances by

land are estimated by them as so many day's journey, but you must ascertain whether your informant means for a horseman or laden camel. The Persian standard of measure is the farsang (Arabic, farsakh), it is about a nautical league, or 6,000 yards.

WORDS OF FREQUENT OCCURRENCE IN CHARTS AND DIRECTIONS.

<i>Arabic.</i>	<i>English.</i>	<i>Arabic.</i>	<i>English.</i>
'Aeich or 'Aish . . .	A hard bank.	Halat, or Khalat . . .	Sand bank dry at low water.
'Abu or Bu . . .	Father of, <i>i.e.</i> , producing, or abounding in, also large.	Jebel	A mountain, also a hill.
Bunder, or Bandar . . .	A landing-place, a sheltered anchorage, whether from all winds or from one quarter only.	Jezirat	An island, sometimes a peninsula.
Barr, or Burr . . .	Territory or country.	Khor	A creek or narrow inlet of the sea; a strait; also a deep channel between shoals.
Bab	A narrow strait or gut, literally a door or gate.	Koh, or Kuh (<i>Per-sian</i>) . . .	A mountain or hill.
Duhet	A bay.	Najweh, or Najwet . . .	A shoal.
Fasht, or Fusht . . .	A reef of rocks.	Ras	A cape, also a projecting point of a reef.
Gubet, or Ghubbet . . .	A deep water bay or inlet.	Rak, Rug, Rigget . . .	Hard bank, shoal but no overfalls; not dangerous.
Gassar	A rock either above or below water.	Shat	Fresh water river.
Hadd, or Hed . . .	A spit of sand, or low sandy point.	Uhm, or Umm . . .	Mother of, similarly used to Abu.

The words *al*, *ar*, *as*, *az*, *an*, *ad*, *at*, which precede many of the names, are different forms of the Arabic definite article; but the *al* before a proper name is a noun signifying family or progeny.

NOTE ON SUDDEN STORMS IN THE PERSIAN GULF.

During the operation of laying the telegraph cable in 1869, the following interesting facts were observed and have been described by Mr. Latimer Clark, F.M.S., in a paper read before the Meteorological Society, "On the Storms experienced by the Submarine Cable Expedition in the Persian Gulf on Nov. 1 and 2, 1869." The first storm occurred at nine o'clock at night, when the vessels of the expedition were about 130 miles from Bushire, and burst upon them without any preliminary warning, lowering the temperature by nearly 30° in a few minutes. It was accompanied by heavy rain and much lightning and thunder, and progressed from N.W. to S.E. After the tempest had lasted for two hours the wind changed to a gale from S.E. and subsequently fell calm as before. The next day the cable was spliced up, and paying out had scarcely recommenced, with a strong S.E. wind, when notice was received that another violent storm from the N.W. had passed Bushire, and was on its way down the Gulf. At 3.52 p.m. the storm burst forth with the same suddenness and fury that characterised the previous one. Suddenly there came a profound calm, and a few hundred yards ahead the squall was seen approaching. The sea was elsewhere covered with full-sized waves, but under the influence of the hurricane it became one dead level of creamy foam, the top of every wave being swept off into spray as soon as it rose. The squall struck the vessel with the same fury as on the previous evening, and the thermometer fell at once from 81° to 53°; torrents of rain swept the deck, accompanied with continuous peals of thunder. After two hours the sky grew bright, and the wind changed into a gale from the S.E., followed by a calm.

STEAMER PASSAGES THROUGH THE INDIAN OCEAN.

A ready reference to those pages of this book, wherein the various steamer passages are described, cannot fail to be helpful to the navigator. We therefore call attention to what has been written elsewhere, whilst adding a few more hints for both outward and homeward voyages.

Outward Bound. In the first place, no steamer should be allowed to pass between Cape Guardafui and Socotra, on her *outward* voyage, during the prevalence of the S.W. monsoon, or from May till the end of Sept. During this period, steamers should navigate the centre of Aden Gulf, passing about 50 m. or more to the North of Socotra. In this track they will get the monsoon, with a long swell, from S.E. by S., as they approach the meridian of the high mountain land of Guardafui, and should then set fore and aft sails, steering E. by N., or even E.N.E., for a few hours. Gradually will the wind now veer to S. by E., then to S. by W., and S.W., enabling a vessel to steer her proper course for Ceylon—about E. by S. $\frac{1}{2}$ S.—as she passes under the lee of Socotra. This passage (marked on the Current Chart for the season between April and Sept.) will be found a great contrast to the heavy and dangerous seas always experienced at that season to the south of Socotra.

From the Red Sea to Zanzibar, the steamer track is (to prevent the crowding of lines) marked on the chart to the S. of Socotra, but the foregoing remarks apply equally well to vessels even going to Zanzibar, and I advise them also to pass to the N. of Socotra; and then—emerging from under the island's lee—to let the vessel come gradually up to the wind, as its veering will permit her fore and aft sails to stand.

Weathering Socotra may appear to the novice an imaginary day's gain, but that time will not compensate for the awful shaking which even a strong steamer may be sure of getting in those high cross seas found to the S. of Socotra.

The S.W. Monsoon steamer track from Bombay to Aden, passing through that oval *soft patch** in the monsoon (which is comprised between latitudes 12° and 6° N., and longitudes 60° and 69° E.), is given at page 315. But if we had a good lighthouse—a coal depot would also be beneficial—at the E. extremity of Socotra, I would advise a shorter route which should give less boisterous weather than is now experienced to the S. of Socotra.

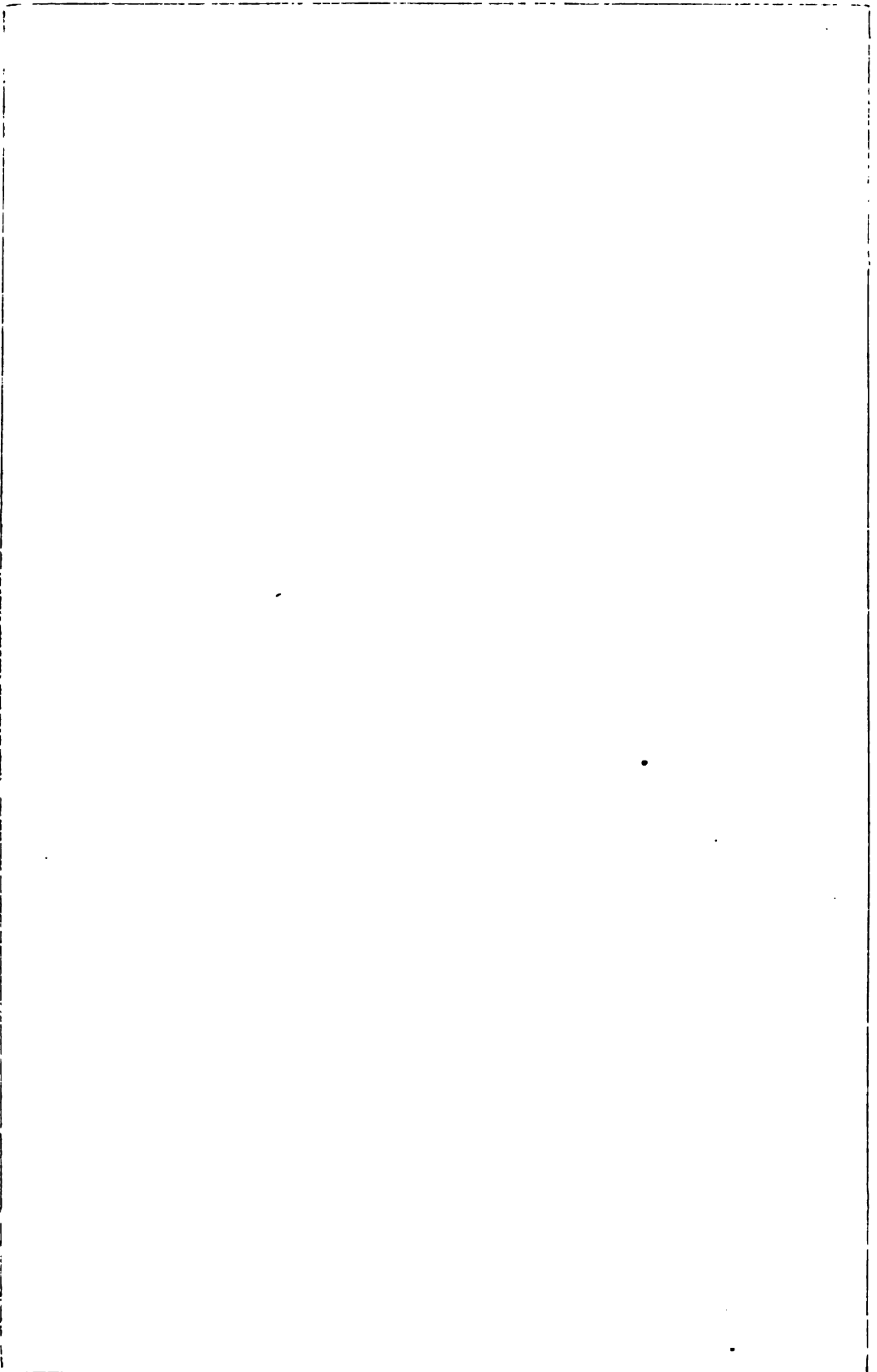
The Socotra route was tried and recommended (more than 20 years ago) by Capt. Hamilton, of the Indian Navy. Its advantage is that, after reaching lat. 7° N., and lon. 61° E., you may bear away to N.W. by W. under fore and aft sails, after having steamed through the monsoon's *soft patch*. Thus you lose no time—as on the other track—in making your Westing with a little Southing against a S.W. by West breeze, annoyingly freshening with every hour's advance. A good light at the E. end of Socotra would enable a steamer to haul closely round that Cape, and steam along under the island's lee till the monsoon bursts out again round its W. Cape. Then, setting fore and aft sails, let her go away W.N.W. at first, hauling up gradually to the S.W. by W., as the wind *backs* to the S. and at length blows from S. by E. after the vessel has reached the meridian of the high land of Guardafui, and is about 50 m. to the N. by W. of that Cape. From this position let her proceed through the Gulf of Aden as directed at page 315.

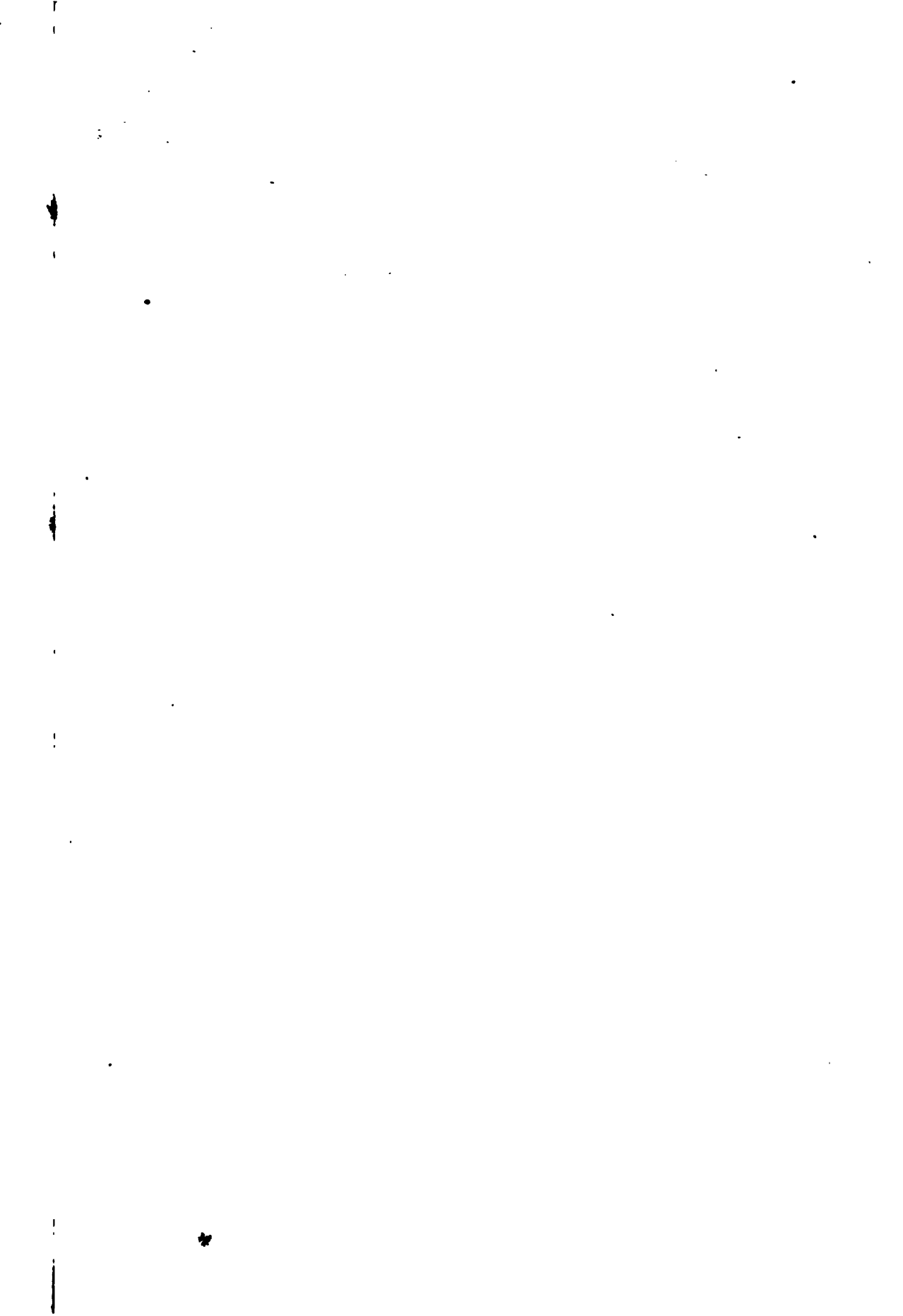
From Bay of Bengal and Malacca Strait, the steamer track for the S.W. monsoon—the short S. Passage—is described at page 327.

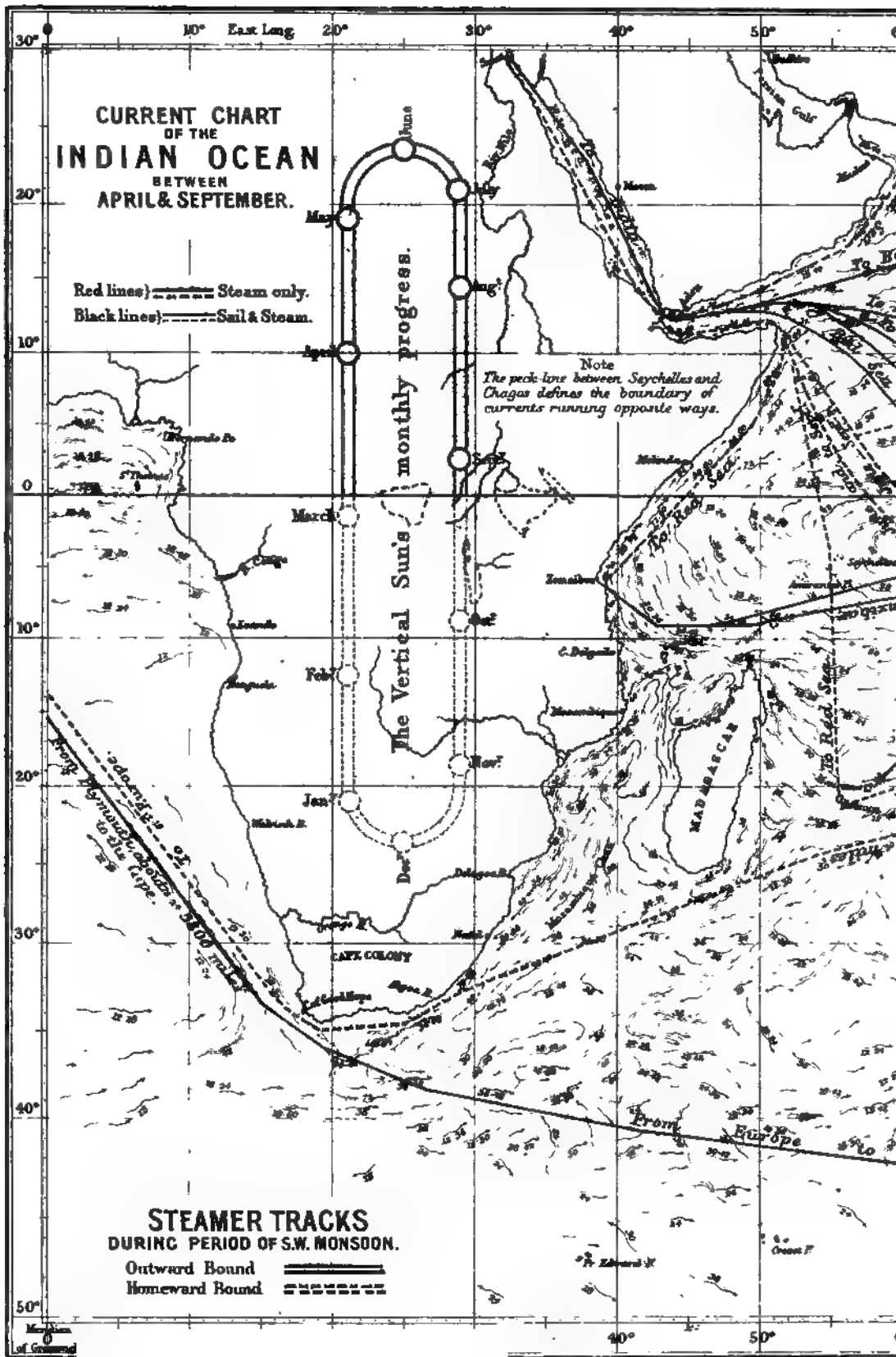
From Sunda Strait to the Red Sea, the best track for the S.W. monsoon is given on the Chart facing page 297, and fully described at page 672. But the Malacca Strait offers, during the N.E. monsoon, the most advantages for a homeward-bound steamer from China.

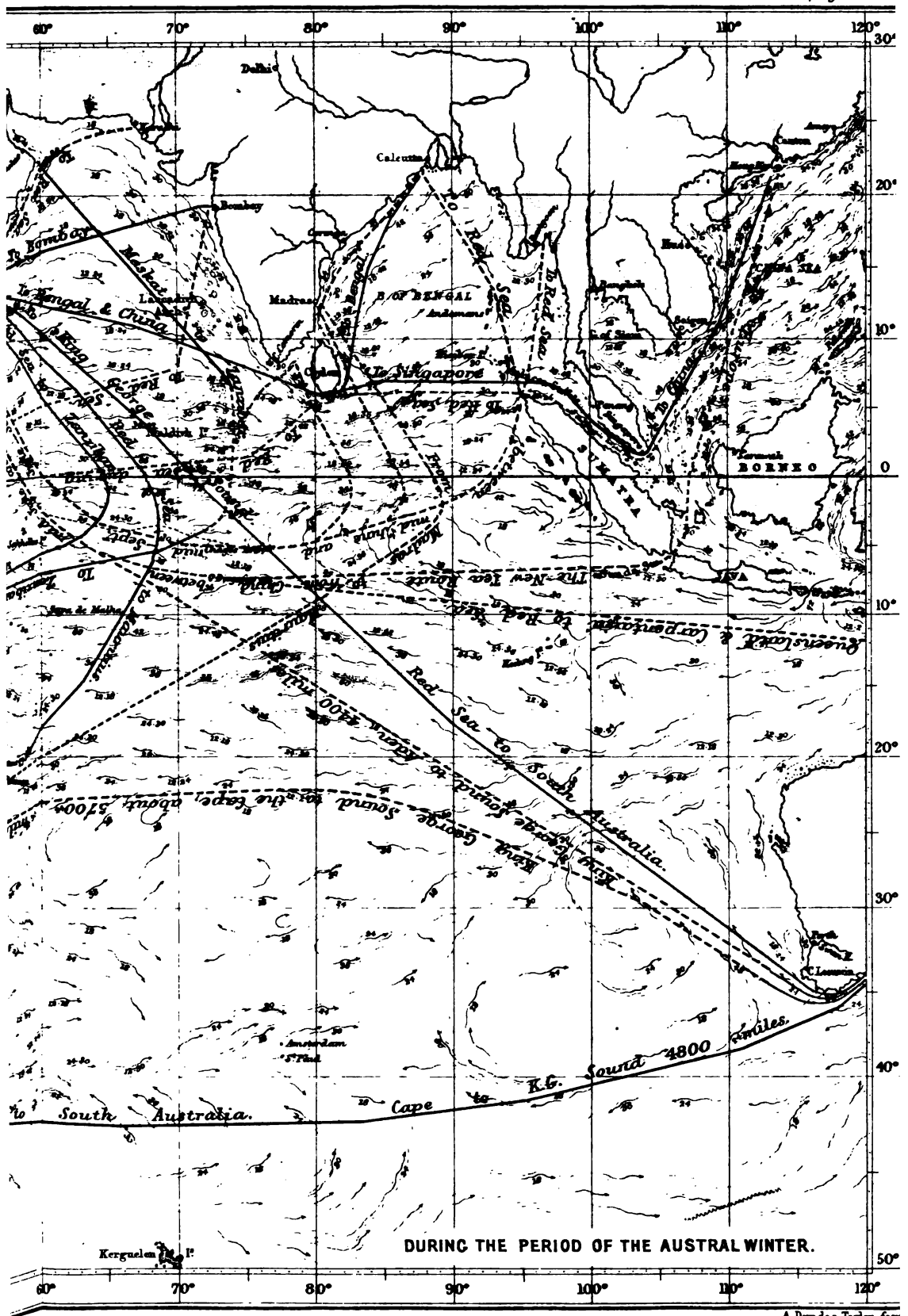
Steamers, outward bound to Sunda Strait, from mid-Nov. to mid-March, may make a good S.E. course from Cape Guardafui towards the Chagos Islands, aided by fore and aft sails; and, when below the Equator, they may be able with prevailing Westerly winds to run under square sails to Sunda Strait.

* Apparently a "*soft patch*"—wherein the winds are very light—exists at this central portion of the Arabian Sea throughout the year; though its area may assume a different shape and size and its position may change. Light airs and calms certainly prevail throughout the N.E. monsoon on the highway between Minikoy and Socotra, but not to the West of the meridian of the Persian Gulf entrance. About Socotra, and for 400 miles to the S.E. of that island, Northerly gales with rain may be expected from Nov. to Jan. It is recorded, however, that cyclones have occasionally past through that "*soft patch*," as they roll away to the westward across the Arabian Sea. A falling barometer would indicate the approach of these *abnormal* gales; for it usually stands high and has little range hereabouts between Oct. and Feb.









SECTION IV.

BRITISH INDIA. SIND TO BURMAH, WITH CEYLON.

CHAPTER XII.

REMARKS ON WINDS AND PASSAGES.

W. COAST OF HINDOSTAN—WINDS—CLIMATE—WEATHER—PASSAGES UP AND DOWN—PASSAGES FROM
W. COAST TO RED SEA AND PERSIAN GULF—WINDS AND MONSOONS IN BAY OF BENGAL—
PASSAGES TO AND FROM MADRAS, BENGAL, AND BURMAH—PORTS OF BRITISH INDIA.

(THE MERIDIAN OF NO VARIATION RUNS ALONG THE W. COAST OF INDIA.)

W. coast of Hindostan. The peninsula of Hindostan is bounded on the S.E. by the Bay of Bengal; on the S.W. by the Arabian Sea; on the N.W. by the Sulimani range, and the hills of Beluchistan; and on the N.E. by the Himalaya Mountains, whose peaks are covered with snow, the melting of which supplies the floods of the River Indus. The Western Ghauts are the magnificent chain that runs N. and S. along the W. sea-board, at a distance of 10 to 30 m. from the ocean. The mountainous region may be said to begin 200 m. N. of Bombay, on the E. of Guzerat; but, the chain being broken by the Nerbudda and Tapti, the Western Ghauts are generally considered as beginning S. from the latter river. Their N. part, forming the S. side of the Tapti Valley, is called Siadri, and thence to the Kundahs, the W. range of the Nilghiri Mountains, the chain is 800 m. long. Then comes a gap about 20 m. broad, called the Palghat Valley (through which the Madras and Bepore Railway passes), and then a further extension to the S. of the chain of the lofty Ghauts for nearly 200 m. to Cape Comorin, where the sea may be said to wash their base. On the N. and W. of this mountain-chain we have an immense desert (the hills of Kutch and Katiawar standing up merely as islands out of the vast plain, quite on the sea-face of this desert), and beyond this the River Indus, or Sind, skirting in its course the E. base of the Beluchistan and the Sulimani Mountains.

The vast table-land of the Deccan, shelving or sloping gently from the E. side of the Ghauts, is bounded on the N. by the high lands of Malwa, and extends to E. for hundreds of miles, and to S. till terminated by the mountain spur which stretches from the Nilghiri Mountains towards Madras. A border of low land stretches from the base of the W. mountains to the sea, varying from 5 to 50 m. in breadth, and its average elevation is about 30 ft. above the sea-level; this belt of low land is broken in a few places—Cape Comorin, Mount Dilly, and Carwar Head—by spurs running from the Ghauts into the sea. In consequence of the immense rain-fall against the W. sides of the Ghauts, this low tract is traversed by many rivers, which in the South of India form that extraordinary series of shallow lakes called back-waters.

Thus it will be seen that the peninsula of Hindostan has four distinct features,—firstly, a central table-land of an average elevation of about 1,500 ft.; secondly, a wall of mountains along its W. side, clad with verdure, and averaging in elevation about 4,000 ft., but in the S. attaining to 8,000 ft. at the Nilghiri Hills; thirdly, the low belt betwixt the foot of the mountains and the sea; and fourthly, the vast desert-like space from Guzerat to the W. extreme of Sindh, which is shut in by the Pubh Mountains, the hilly barrier that marks the N.W. frontier of the British dominions.

Rivers. The Indus, with its many mouths, is by far the most important on the W. coast of India. From its source, at an elevation of some 18,000 ft. in the Thibet country, N. of the Himalaya Mountains, the principal stream of the Indus travels in a general N.W. direction for nearly 700 m., then turning W., and breaking through the Hindu Kush range, trends S.W. and S. past Attock and Hyderabad to the sea, a further distance of 1,100 m., thus making its entire length about 1,800 m. At Attock, the limit of the upward navigation of this river, and some 900 m. from its mouth, its bed is about 1,000 ft. above the sea, thus making the fall in its navigable course to be little more than 1 ft. per m.

The delta of the Indus is composed of thirteen estuaries, and their mouths are spread over a sea-face of 100 m.; all these discharge more or less water during the inundation season, but in the winter, or season of low water, the Indus is said to discharge fresh water by only one channel of importance, the Kukiwari. The inundation of the country that borders on the Indus (unlike that of the Malabar coast and Gulf of Cambay, which is caused by the rains,) originates with the melting of the snows in the Hindu Kush and Himalaya Mountains; commencing in spring, about the end of March, it retrogrades as autumn advances, after mid-Sept., having attained its maximum in the first week of Aug., when it spreads the alluvial matter the water has held in suspension over the face of the country, thus annually renewing the fertility of the soil. The unhealthy season on the banks of the Indus is when the inundation subsides.

Cutch and Katiawar have merely a few creeks, not worthy of notice, though in the rainy season some of them discharge a considerable body of fresh water.

There are a great many rivers along the W. coast of Hindostan, but, the mountain-ridge running close to the sea, their courses are of limited length, and their navigation is confined to an average of a dozen miles from their mouths; in fact, these rivers may be simply regarded as the discharge pipes for the flood of rain-water which, in the S.W. monsoon, is precipitated against the face of the Ghauts, and rolls to the sea in impetuous torrents. To the N. of Bombay are four large rivers, emptying themselves into the Gulf of Cambay—the Tapti, Nerbuddah, Mhye, and Sabermati.

The Nerbuddah has its source in the Vindhya Mountains in the Bengal presidency, about half-way between Calcutta and Bombay, at an elevation of between 3,000 and 4,000 ft. above the level of the sea, into which it falls after running a W. course of 800 m. The influence of the ocean-tide is felt about 50 m. from the sea, and throughout this part of its course the river's breadth averages 1 m. Vessels of 100 tons can ascend at high tide to the town of Broach, nearly 30 m. from its mouth, but skilful pilots are necessary.

The Tapti, running nearly parallel to but some 30 m. to S. of the Nerbuddah, has a course of little more than 400 m., in which it descends more than 2,000 ft. from its source not far from Nagpore; it is much inferior to the Nerbuddah, but is still a very respectable stream; serious loss of life and property has been occasioned by its overflow in the rainy season. At high tide steamers can go up to Surat, about 16 m. from its mouth, but at L. W. in the dry season the river is fordable at that place.

The Mhye is smaller than the above, the length of its course being about 330 m., and the elevation of its source less than 1,900 ft. At the town of Cambay, near its embouchure in the gulf of that name, the bore-wave is experienced every flood-tide at the springs, when the maximum initial velocity of the tide is, for a few minutes, at the rate of 10 m. an hour, thus rendering the head of the Cambay Gulf very dangerous to vessels which are so unfortunate as to get aground on the numerous banks.

The Sabermati, the most N. river of the Gulf of Cambay, runs a course of nearly 200 m. in a S. direction past the city of Ahmedabad from near Mount Abu, in Rajputana; its navigation is limited to about a dozen miles from the sea, and at spring tides it experiences the bore-wave, though to a less extent than the Mhye River.

Soundings. The outline of the bank of soundings along the entire W. shore of Hindostan (with few exceptions) is now well depicted on the charts, but the nature of the bottom varies so much that but little general description can be given. In the Gulf of Manar it is principally sand and coral rock, and the same off Cape Comorin. Along the Malabar coast, to the S. of Quilon, there is little or no mud; to the N. of that place to Mount Dilly, the mud extends out to the depth of 20 fathoms, and above that cape, out to 30 fathoms.

Upon the coast-bank of soundings there are some few shoal spots which serve as direction-banks to contiguous harbours; these will be noticed off their respective ports. But there are also some out-lying banks, between which and the bank of soundings there is no bottom obtainable with the deep-sea lead; some of these are fully described in the Chapter about the Lakadivhs, but are likewise here noticed as forming the W. side of the channel between those islands and the Malabar coast. These out-lying banks are the Eliccalpeni Shoal, the Padua Banks, and Angria Bank. The first only of these is shallow, and must be avoided as dangerous; the others, being well submerged, may be sounded upon to get a knowledge of the ship's position.

Eliccalpeni Bank, 30 m. N.E. by N. of Anderut Island, is the E. danger of all the Lakadivhs; and, though not supposed to have less depth than $3\frac{1}{2}$ fathoms, is, at all times, to be avoided, being composed of sharp coral rocks, on which a large ship would probably strike, when the sea is running high. This Bank is in the latitude of Calicut, from which place it is distant rather more than 100 m., but from Mount Delly it bears S.W. by W. only 83 m.

Padua Banks, called also Bassas de Pedro, and by the islanders Munyal-par and Cora-dioh, the N.E. banks of the Lakadivhs, may be safely sounded upon, having no less than 20 fathoms water. On the little Sesostri Bank, to the W. of Padua Banks, the least water found was 11 fathoms. Therefore these Banks may be safely sounded upon to ascertain a ship's place. It is probable that other banks may exist between the last-named and Angria Bank, but no examination is known to have taken place, though Ada's Bank, with 38 to 52 fathoms, is reported as lying between the 14th and 15th parallels.

Angria Bank. The E. extreme of this Bank, having a depth of 15 fathoms, is 65 m. due W. from Viziadroog. In length, nearly N. and S., it is 22 m.; in greatest breadth, 12 m.; least water ever found was 11 fathoms towards the N. part; but, as much live coral was found there, the depth may decrease in course of time. It is steep all round, with deep water between it and the coast-bank of soundings. While the surveying vessel was anchored on it, in the end of November, the rise and fall of tide at springs was 9 ft., H.W. a little before 11 h. Angria Bank is essentially the direction Bank of Viziadrug.

GENERAL REMARKS on the WINDS. The navigation of the W. coast of Hindostan is perhaps less hazardous than that of any equal length of coast in the world. As the winds are generally favourable for sailing down the Malabar coast, particular directions for its navigation from N. to S. are not needed for the fine season, when the mariner has but to trim his sails and seldom to alter his course. A S. current, the product of the many rivers, helps his vessel onwards in the six weeks or so of calms and light winds which prevail after the S.W. monsoon, until the land and sea-breezes are fairly established.

The fine season is from Oct. to May; and, for its four middle months, alternating land and sea-breezes prevail without intermission, affording pleasant and speedy passages either to N. or to S.; and for the months between the monsoons, or the period of change, the veering of the wind through six to eight points of the compass, in the vicinity of the land, only requires a little study or practice before the navigator should be able to make good progress in his voyage up the coast.

But, although throughout the Arabian Sea, from Hindostan to Africa and Arabia, and amongst the Lakadivh and Maldivh Islands, the N.E. monsoon is constant in direction and force for half the year, the peculiar configuration of the lofty W. coast mountain chain of Hindostan causes such anomalies in the prevailing winds as fairly to take away from the season the name of N.E. monsoon, that is to say, so far as the characteristic wind along the sea-board is concerned; though we here retain the name as indicating that period of the year when the sun is S. of the equator.

Attention to these remarks will enable the navigator to understand differences in the writings of physical geographers, whose atlases will certainly confuse him with the diverse accounts they furnish. Thus we read of the "N.W. monsoon" of Bombay, by which is meant the period between Feb. and the S.W. monsoon, in which the land-wind is scant and undecided, and becomes, like the "along-shore" S. winds of Madras, at the same season, merely a slight modification of the sea-breeze. The winds off the coasts of Konkan, Canara, and Malabar at that season, veer only between N. and W.N.W., the former springing up an hour or two after midnight, the latter before or about noon.

The air on the surface of the earth seems continually to rush towards that belt of latitude on which the sun's rays are concentrated. Thus, from Oct. to April there is a great rush of air from the N. regions, over the mountains of Central Asia, flowing for six months towards the S., and this constitutes the Northerly or N.E. monsoon. When the sun, on his journey from the S. to the N. solstice, having crossed the line, increases his N. declination, the winds come less from N. and more from W., thus forming the N.-Wester season of the Malabar coast, till the setting in of the S.W. monsoon brings a rush from the S. for about three months.

These two masses of air, the N.E. and the S.W. monsoons, thus set in motion from opposite directions, are also totally opposed to each other in character. That from the N. is cold and dry, from the expanse of arid desert which it has traversed, where it has thrown off all its moisture in the shape of snow, winter rains, or dew. That from the S.W., sweeping over thousands of miles of sea before it reaches Hindostan, comes saturated and laden with moisture. The intermediate wind—as we may call the N.-Wester of the W. coast from Karachi to Cape Comorin—shows from its dampness, as soon as the sun has set, that it is essentially a sea-breeze to cool the heated belt of low land lying betwixt the Ghauts and the sea.

GALES. The W. coast of India is occasionally, but by no means frequently, visited by very violent storms (excepting the steady S.W. monsoon gales), and this partial exemption must be attributed to the lofty wall of mountains that shuts it off from the Bay of Bengal, where storms seem much more frequent. Nevertheless, some severe gales have been experienced, and these are recorded for two-thirds of the months in the year.

During the early voyages of the Portuguese along the Malabar coast, storms appear to have sometimes happened in Jan.; at present this is the most pleasant month of the season. In Jan., 1871, the *General Outram* steamer foundered in a gale off Rutnagherry; it began as a S. wind, and after several hours had veered to N.W., when the confused sea broke over her decks and swamped her; several lives were lost.

In February, strong W. gales are said to be sometimes encountered off the mouths of the Indus; in 1833 the E.I.C. schooner *Shannon* was caught in one which lasted twelve hours, causing the destruction of about a dozen large native vessels. The N.E. winds in this month, off the coast of Bombay, are sometimes interrupted by sudden squalls from S. to W., against which the seaman must be guarded. On Feb. 3rd, 1857, the E.I.C. steamer *Ajdaha*, at 70 m. to S.W. of Dwarka, had strong winds from S.W. for twelve hours, shifting in a violent squall to N.E. with heavy rain. Captain Horsburgh experienced a strong gale at N. for twelve hours, off Choul, in the second week of Feb., 1791. Fresh N.W. winds are in some seasons felt on the Malabar coast.

For the month of March there is no record of a gale, but the N.-Westers of the coast are pretty brisk, sometimes towards evening, especially off Mount Dolly.

In April, some gales (cyclones) have been experienced. In 1782 a very heavy storm from the S. blew on most parts of the coast, in which men-of-war and merchantmen foundered. Since that time no severe storm was recorded till that of 1847, commonly called *Cleopatra's* cyclone, because the E.I.C. steamer of that name foundered somewhere off Mangalore on that occasion. This was felt off Ceylon, and travelled up the whole coast, the vortex passing at no great distance; thus the trend of the shore-line being N.W., the storm took the character of a S.E. gale, right along the coast from Cochin to Goa; whereas in the offing, that is to say 100 m. from land, some ships had it beginning from N.E. and ending at N.W. We have already noticed that the Maskat shipping suffered severely from a gale, only two or three days after this cyclone along the Malabar coast.

In May, heavy gales from S.W., in anticipation of the monsoon, have been occasionally experienced off Bombay. Most of these S. winds of April and May are preceded by or attended with a luminous sea at night, caused by fish spawn and medusæ, minute globular bodies linked together; in the day-time they give a dirty brown or reddish appearance to the water.

In June, in some seasons, ships have been dismasted at some distance from the coast, when the monsoon has commenced with severe storms; that of June 1837 was particularly disastrous to the shipping in Bombay Harbour, and the *Shah-Byramgore* was wrecked near Versovah, in a heavy gale from the W., that set in after she had worked out of Bombay. In 1811, in this month, a storm was felt by a vessel some miles to the S.W. of Bombay. The steady gales of the S.W. monsoon on the W. coast, though violent at times in June and July, and frequently bringing ships to close-reefed topsails, not being of the character of revolving storms, or sudden unexpected gales, will not be spoken of here, but in their place under the head of monsoons.

Sometimes in the end of Sept., but more generally in Oct., the Elephanta gale happens at Bombay, often blowing violently for several hours from S.E. and S. This stormy period, which ushers in the rainy season of the Coromandel coast, and closes that of the W. coast of Hindostan, has happened late in Oct., and sometimes early in Nov., after which the N.E. monsoon is fairly established. Occasionally, however, the monsoon of Bombay breaks up without any violent storm of wind, though much rain may fall.

In one of these S.E. gales, which happened at Bombay about the beginning of Nov., 1799, several ships were driven from their anchors in the harbour; it veered to the E. and blew a hurricane for some time; the ships *Hercules* and *Hunter* drove on the rocks under the castle; the latter was completely wrecked, the other obliged to undergo repair. In Nov., 1851, a gale occurred between Bombay and Karachi, in which the steamer *Surat* foundered; this gale was felt in the gulf

of Kutch, as recorded in the chapter on that portion of India. In the beginning of Nov., 1854, another severe disastrous gale was felt at Bombay, and this, like that of April, 1847, ran up along the Konkan and Goa coasts from S.E. and S.

For Dec., which is such a beautiful month generally, we have recorded a gale from the S.E. and N.E. to E., as occurring to the E.I.C. sloop *Elphinstone*, when 120 m. to the W. of Dwarka. This appears to have been local, and was doubtless the weather which Captain Horsburgh formerly noticed in his Passages from India to Maskat, thus, "with the Gulf of Kutch open, it sometimes blows strong at E. and E.S.E., accompanied by cloudy weather. When the wind is Northerly, the sky is clear and serene; when N.E., beware of sudden squalls, indicated only by the rapid motion of a small cloud that accompanies them, giving very little warning."

The above statement of gales that have occurred throughout the year will suffice to put the navigator on his guard, should indications of coming tempest present themselves in the sky, especially at the periods of change between the monsoons.

CYCLONES. Of the gales above recorded, those disastrous ones of April and Nov., or the latter part of Oct., were decidedly revolving storms, whose centres, passing to the W. of Ceylon, travelled to N.W., at some little distance from the coast, under the lee of that mountain wall, the Western Ghats. Thus, along the sea board they assumed the character of S.E. gales, whilst the vortex was nearest to, that is opposite each port, when of course the wind was most violent. A very low and falling barometer heralded that of April, 1847; and—as such a great depression of the mercury never accompanies the ordinary strong winds of the Malabar coast—such an indication, in April or Nov., with a stormy sky, should not pass unheeded by the mariner. Some of the Lakadivh Islands were partially for a time submerged by the storm-wave of the April cyclone of 1847, and the inhabitants state that such an event has happened before.

In Oct., 1842, a cyclone, which had its origin in the bay of Bengal, seems to have passed over the continent of India, about the 11th parallel of latitude, (the low gap of Palghat, between the Nilghiri and Anamullay mountains,) and rolled away to W. of the Lakadivh group for some hundreds of miles, but not so far as Socotra or the Arabian coast. However, the large troop-ship *Serapis* suffered some damage in a cyclonic gale in Oct., 1871, between Socotra and Bombay.

As the character of these revolving storms is now well understood through the researches of Redfield, Reid, Thom, and Piddington, a vessel passing up or down the Malabar coast at the above epochs may be navigated so as to avoid the centre of the storm, and even advanced on her course, by attending to the directions given in some of the works of the above eminent authors; no vessel trading to the East Indies should be without "Piddington's Horn Book of Storms," and, "Remarks on Revolving Storms," published by the Admiralty in 1853.

LAND and SEA-BREEZES. The season in which these are experienced, is from the autumnal to the vernal equinox; but, with such a wall of mountains as we have along the W. coast, the strength and duration of the land-wind, depends much, as might be expected, upon the configuration of the land. The land-wind of the Gulf of Manar and of all the Malabar coast is of course only the N.E. monsoon of the Bay of Bengal, similarly as the land-wind of the Coromandel coast is a prolongation of the Malabar S.W. monsoon.

Thus we find that, where there are gaps in the mountain chain, as at Palghat, on the S. of the Nilghiri Mountains, the land-wind in Dec. and Jan. off Ponani continues to blow for more than a whole day without any intervening sea-breeze sometimes. This occurs also, but in a rather less degree, off Carwar Head, where the valley of the Sedashigar River assumes a straight funnel-shape to the E., towards the interior table-land.

Again, in the Gulf of Kutch, and off the Sind coast, the N.E. winds in Jan. sometimes blow for forty hours at a stretch, merely relaxing in force at the hours when a sea-breeze is due, and being strongest in the morning two or three hours after sunrise, when the land-winds are usually strongest. At the times when these continuous land-winds are blowing, the parching dryness of the atmosphere is most trying.

In acquiring a knowledge of the land and sea-breezes of the W. coast of India, we shall do well to look at those of the same period on her S.E. coast. On the W. coast of Ceylon land and sea-breezes occur in Dec. and Jan. beneath the mountains of the island, as on the Malabar coast. But along the Indian shore of the Gulf of Manar, the winds do not assume the character of land and sea-breezes until Feb.; from the middle of Nov. till that month they are N.N.E. to E.N.E. In Feb., when Madras gets her sea-breeze in the afternoons from S.E. to S. (the "along-shore winds,") the Tuticorin coast gets the same, but there of course *deal on* to the shore. By April, the general direction of the wind in the N. part of this gulf is found to have drawn round to the S., the sea-breezes being from S.E. on the Indian shore, and from S.W. along the N. Ceylon shore, but N.W. between Colombo and Point de Galle, as they are then N.W. along the whole Malabar coast.

What is called "the *along-shore wind*" at Colombo, on the W. coast of Ceylon, is a dry cutting wind, coming from about N.N.E. over the low land; it cracks furniture, and is dangerous to sleep in, like the E. land-winds of the Malabar coast.

The sea-breezes of the Malabar coast are fairly established throughout Oct. (while as yet the land-winds are only occasional, light, and uncertain,) and they seldom fail, except in the peculiar localities already noticed, till they are merged in the S.W. monsoon. Thus the navigator may calculate on sea-breezes for eight months of the year, but on regular land-winds for only half that period. It is of course the sea-breeze that makes the climate of the W. coast so pleasant during the fine season. Further remarks upon these land and sea-breezes, with directions how to profit by them, will be found under the head of N.E. monsoon.

The N.E. MONSOON, or fair-weather season, generally commences about the middle of Nov. at Bombay and on the N. parts of the coast; but sooner to the S. of Mount Dilly, about Calicut, Cochin, and Anjenga. At the observatory of Dodabetta on the Nilghiri Hills, at the elevation of 8,600 ft., the winds are N.W. for the first half of Sept., and have veered to N.E. before the end of the month; throughout Oct. N.E., increasing in force; in Nov., fresh; in Dec., often violent. The navigator may therefore expect N.E. winds below Calicut throughout the month of Oct. The strong S.W. and W. winds off the Konkan coast, fail after the middle of Sept., and are followed by light variable breezes, frequent calms, cloudy weather, and showers at times. This unsettled state of the weather between the monsoons, generally begins late in Sept., and continues six or eight weeks; the prevailing winds are from N.W., in the shape of sea-breezes, but at times from S.W. and S. At other times squalls may happen, blowing from the land, although these are seldom experienced in Sept. or Oct., except on the Canara, Malabar, and Travancore coasts.

At the breaking up of the S.W. monsoon there is often much thunder and lightning; it is sometimes attended with a sudden storm from S., which veers to S.W., but generally to S.E., blowing very violently for several hours. This storm has generally happened late in Oct. or early in Nov., after which the N.E. monsoon sets in, with land and sea-breezes and fine weather; but the monsoon frequently breaks up without any storm.

The navigation from S. to N., or up coast, in Oct. and great part of Nov. is usually tedious and uncertain, for there is no dependence on the winds till late in Nov. But, though light, they cannot on the whole be called unfavourable for sailing down the coast, and the drain of current to the S., fed by the freshets of the many rivers, aids a vessel's progress amazingly. About the beginning of Dec. the sky becomes serene, with land and sea-breezes favourable for sailing up and down the coast. In this clear weather, in Dec., Jan., and Feb., when land and sea-breezes are regular, the sea is remarkably smooth near the coast, and the sky very serene without any clouds; but in April the weather becomes hazy, and at times cloudy over the land in the evenings, with light showers.

In Dec. and Jan. the land-winds are regular and strong; and at times, to the S. of Calicut, they continue to blow through a large chasm in the Ghauts upwards of twenty-four hours, without any intervening sea-breeze. In these months a passage may sometimes be made from Cape Comorin to Bombay in eight to ten days, and the return voyage in four or five days. In Nov. and early in Dec. the sea-breezes are very weak, but become stronger afterwards. As Feb. advances the land-breezes decrease in strength and duration, and are not always regular.

When the land and sea-breezes are regular, the latter fail in the evening about sunset, and are generally followed by a calm, which continues until the land-wind comes off; this may be expected to commence at 8 h., 9 h., or 10 h. p.m.; at first, it comes in fluctuating, gentle breezes, but soon becomes steady between N.E. and E.S.E., continuing so till 9 h. or 10 h. a.m. next morning; it then begins to fail, decreasing to a calm about mid-day. About this time, or a little past noon, the sea-breeze sets in from W.S.W., W., or N.W., a pleasant refreshing wind, and generally veers to the N. in the evening, then decreasing in strength.

These land and sea-breezes require the attention of the navigator to benefit by them to the full extent. During the night, with the land-breeze, it is prudent to keep well in shore, if the wind will admit, without tacking, for there it is stronger and more steady than further out; but in the morning it is advisable to edge more out to get an offing of 15 or 20 m., or in soundings of 26 or 30 fathoms before noon, ready for the sea-breeze. In the evening, it is proper to be near the shore, before the land-breeze comes off. The coast may be approached to 8 fathoms in most places from Bombay to Quilon; and if a vessel gets close in, prior to the commencement of the land-breeze, she ought to make short tacks near the shore until it comes off: when calm, its approach is frequently known by the noise of the surf on the beach, which is heard at a considerable distance.

In March and April the land-breezes are very faint and uncertain, seldom coming off till morning, and continuing so short a time that little advantage is gained by them; ships are obliged to stand right out to sea to gain an offing, to be ready for the sea-breeze. In the former months,

the land-breezes are generally the strongest winds, but now the contrary, for the sea-breezes prevail greatly. They may at this time with propriety be called the **N.W. monsoon**, for they usually set in about noon at W. by N., or W.N.W., veering gradually to N.W. and N.N.W. in the evening, from which quarter they continue during the first part of the night, declining afterwards to a calm about midnight, or early in the morning. A faint land-breeze sometimes follows: but, more frequently, light airs from the N. or calms may be expected, nearly from midnight until the N.W. wind sets in about noon on the following day. These N.W. winds, at the F. and C. of the moon more particularly, blow strong, producing a short chopping sea and a drain of lee current, making it necessary for a small vessel to anchor at times with a light anchor, when it falls calm, to prevent being driven to the S. In April the weather is mostly hazy, and at times cloudy over the land in the evenings, with light showers. In some seasons, gales have been experienced, as stated under the head of gales (at page 300.)

In May the prevailing winds are from N.W. and W., but often very variable and uncertain, with cloudy threatening weather at times, and lightning from S.E., and light showers of rain. A gale from S.W. or S. is liable to happen in this month, by which several ships have speedily run along the coast to Bombay; but it is prudent to keep well out from the land, prepared for bad weather, to prevent being driven on a lee shore if a storm should set in from the W. When N.W. winds prevail, the weather is settled and clear of clouds, though a little hazy, but cloudy and threatening, when they blow between S.E. and S.W. It sometimes happens that heavy clouds collect over the land in the evenings, producing a hard squall from the E., with rain about midnight; this has frequently been experienced between Mangalore and Hog Island, both in May and early in June, when these land-squalls blow in sudden severe gusts through the gaps between the mountains, but they last a very short time.

During the period of change before the S.W. monsoon, the small coasters run, in the afternoon, into the nearest river or place of shelter, but large vessels would do well to give themselves sea-room. The boldest sailors of the coasting-vessels, carrying cargoes of the new season's cotton crop, now venture to continue making trips up the coast to Bombay, till overtaken by the S.W. monsoon; they seem to be sure of an interval of one good week's fine weather, if a first burst of the monsoon comes in the end of May, for its *dus time* is the first week in June.

In the Gulf of Manar the N.E. monsoon sets in with force about mid-Nov., and lasts till the end of Jan. It blows steadily from N.N.E. along the Indian shore, but on the opposite coast, the N.W. part of Ceylon, it is modified into land and sea-breezes, with very fine weather. In Feb. land and sea-breezes commence on the Indian side; and, by April, the wind in this gulf will be found to have drawn round to the S.; the sea-breezes being from S.E. to S.W., according to the coast on which they prevail; this is also the season of the Madras *along-shore* S. winds. These sea-winds of Manar now become of longer duration and increase in force till about the middle of May, when the regular S.W. monsoon sets in on the Ceylon coast, anticipating by a few days that of the Indian coast.

The S.W. MONSOON. On the W. coast of Hindostan the S.W. monsoon may be said to prevail for the five months of summer, and the N.E. monsoon for the five winter months, an interval of storms and calms occurring, in both cases, at the period of change. It is usually held that this change takes place about a week after the passage of the sun to the N. or to the S. over the parallel of the place; and that the rains, which always accompany it, follow or retire a few days afterwards. Thus, on the N. coast of India the period of the rainy season is of limited duration compared with that of Malabar. When the rain-clouds of the S.W. monsoon approach the arid plains of Sind and Kutch, they appear to ascend and become absorbed by the air, passing on to precipitate themselves on the mountains to the N.E., and this rain following upon the melting of the Himalaya snows, adds to the stream of the river Indus, and prolongs till Sept. the floods of that great river, which, commencing to rise in the end of March, has attained its maximum height about the beginning of Aug.

From the beginning of Nov. to the end of May, the sky has been cloudless (comparatively speaking, for in the N.E. monsoon there are mare's tails and other light clouds which float in the higher atmosphere,) and not a shower has fallen. Regular sea and land-breezes, setting in before noon and day-break respectively,—the former blowing from N.W. to W. for nine or ten hours, the latter from E. to N.E. for five or six hours, with intervals of calm between,—have filled up the day and night. Large clouds at length begin to make their appearance daily at noon over the mountains, and, advancing up the sky from E., right in the teeth of the sea-wind then blowing, exhibit a grand display, first of sheet, afterwards of forked lightning; after dark, the whole disappears. This goes on from day to day for a week or more, the electric displays becoming more and more vivid and intense every evening. Until the rains actually fall, the clouds invariably disappear immediately

after dark ; and, though the sun may be gone down amid signs of coming tempest, the stars show a cloudless sky down to the very horizon two hours afterwards.

Suddenly, after perhaps a week as above, in the evening a little after sunset, a blast of wind at once darts forth from the stacked-up clouds in the E., followed by a heavy gush of rain, with thunder and incessant lightning flashes. This state of matters generally lasts from one to two hours, when the wind veers round to S.W., blowing with increasing steadiness and diminished force, with rain, but not always continuous, and the thunder is only heard in the distance.

The first burst of the S.W. monsoon seldom lasts more than a single night and part of a day ; and, on the second dawn, the entire face of the burnt and parched earth seems washed and refreshed. The rays of the sun, no longer fierce and intolerable as they were a week before, now shaded by transient clouds, present alternations of light and shade, which exhibit a striking contrast to the unceasing glare of the previous part of the year. After a few days' fine weather of this sort, during which the S.W. wind is strongest in the afternoon as a sea-breeze, the sky gets more overcast, and continuous squalls from the S.W. quarter announce that the monsoon has fairly set in. The rains return with redoubled violence, and continue to pour down for forty or fifty days with an occasional interval of a few days' fine weather. The rain-fall, in June, July, and Aug. alone, amounts at Bombay to about 76 inches.

It has been observed at Bombay that the first stormy weather of the S.W. monsoon seldom comes with the full moon springs, but generally during the dark nights. Although S. winds prevail greatly after mid-May, the stormy weather and rain usually do not set in until the dark nights, some time between the 8th and 15th of June. From the first week of June to the 15th or 20th of July, the weather is generally most unsettled and severe ; hard squalls, much rain, and dark cloudy weather may then be expected in the vicinity of Bombay Harbour.

The rains at Bombay slacken off early in Aug. ; and the natives, on the first full moon of that month, celebrate the departure of the S.W. monsoon on what is called Cocoa-nut day. The boldest then put to sea ; and all their vessels, having been laid up and huddled in since the end of May, now prepare for sea.

The Elephanta. After some weeks in Sept. of open weather, mostly fine and pleasant, but frequently showery, the coast beneath the Western Ghats (called in general the Malabar coast,) is usually visited in the end of Sept. or the beginning of Oct., by a furious E. wind, with rain and thunder : this is called the Elephanta, which finally closes the rainy season.

Malabar Monsoon. The above description of the setting in of the S.W. monsoon at Bombay will do for the whole coast of Konkan and Canara. But in Malabar, to the S. of Palghat Gap, the peninsula becomes narrower, and altered conditions cause a difference in the manner and in the time of the monsoon's approach. In Travancore it commences earlier than on the Konkan coast, the difference in time being frequently 15 or 20 days between Cape Comorin and Bombay. The fair weather sets in proportionally sooner to the S., where ships may anchor in Sept. in safety, or even in Aug., if care be taken to lie well out, ready to proceed to sea on the appearance of a gale, though a severe one seldom happens in Aug. or Sept. on the coast to the S. of Mount Dilly, the wind being then much from N.W.

On the S. part of the Malabar coast, the S.W. monsoon usually sets in late in May, frequently commencing with a gale from S.E., veering to S. and S.W., where it ultimately becomes fixed ; at other times it commences with squalls from S.W., and a heavy long swell rolling in upon the shore. This swell is generally the herald of the S.W. monsoon. In June, after the monsoon has set in, the wind keeps mostly between S.W. and W. by S., with severe squalls at times, much rain, and a high sea. In July the weather is nearly the same, becoming a little more settled as the month advances ; the squalls veering sometimes to W. and W.N.W. The sky is mostly obscured by heavy clouds during these months, precluding observations for several days at a time, but considerable intervals of fine weather have been experienced in some seasons. Ships have left Bombay Harbour so late as the 6th or 8th of June, and, with fine weather, passed down the coast without making a tack, the wind prevailing at W.S.W. and W., steady breezes ; but such favourable seasons are seldom experienced.

To the W. of all the islands the breezes of the S.W. monsoon are strong and steady, but towards the coast of Hindostan they are variable in direction and blow in squalls. It has been remarked that almost all the rain-squalls of the Malabar coast, and for 200 m. from land, come from the N. of the W. quarter ; they have been experienced from N.W. at a greater distance than 100 m. W. of the Konkan coast, in the end of July. Off the Malabar and Travancore coasts, in the beginning of that month, during the night, or early morning, a steamer running a parallel course to the coast experienced these rain-squalls from nearly N. ; thus, with the wind right aft, and the swell on her beam, she rolled her ports under water.

In Aug. the monsoon does not blow so violently as in the preceding months; the squalls then veer to W. and W.N.W., particularly on the S. part of the coast. N.W. and W.N.W. winds are those which prevail in this month near Anjenga and Cape Comorin. In Sept. the weather becomes more moderate, the W. and W.N.W. winds being more prevalent than any other in this month; the squalls now are seldom severe, although the weather is often cloudy and threatening, with heavy showers of rain. A great swell often rolls in from the W.S.W. in this month, particularly during unsettled, squally weather, which sometimes happens.

In examining the registers of the wind-gauge at the observatory of Trevandrum (only 3 m. from the sea-coast) and of Dodabetta (on the highest peak of the Nilghiri Mountains,) it was found that, at both places, the wind comes from S.W. for a very few days only, at the commencement of the monsoon; it soon veers more to W., and by mid-Aug. is fairly N.W. At the last-named mountain-top, the wind becomes N.E. in the end of Sept., or sometimes very early in Oct.

In the Gulf of Manar, the S.W. monsoon sets in about mid-May, and is attended with heavy rain, much thunder, and lightning, particularly along the Ceylon shore, where the wind blows right on to the land. Along the Tinavelly coast it has more the character of an along-shore S.W. wind, and is robbed of most of its moisture by the interposing Travancore Ghauts; thus the Indian shore of the Gulf of Manar has to wait till the end of October or beginning of November for its rainy season, while Ceylon has its greatest rain-fall in May, and another, though rather less copious, in October and November; the intermediate months being also rainy, but July and August in a less degree than others. June is the month of the S.W. monsoon's greatest force in the Gulf of Manar; in August the strength of the wind abates, but strong S. winds are still experienced in this and the following month, becoming lighter as the season advances. Variable and gentle breezes, with smooth water, may usually be expected in October, lasting till the setting in of the N.E. monsoon, in the end of that month or the beginning of November, by two or nearly three weeks of heavy rain; this is what is termed the Madras monsoon.

WINDS and WEATHER in the GULF of CAMBAY off SURAT. In Jan. the winds are mostly from N.N.E. to E., veering occasionally to N. during the afternoon. Weather delightfully cool and pleasant. In Feb. the winds are variable from N.W. to N.E., generally light, but occasional fresh breezes are experienced. Weather pleasant and cool.

In March the winds are variable all round the compass, blowing fresh for two or three days at times, but chiefly light throughout the month; weather cool and pleasant, with the exception of a hot wind experienced for a few hours now and then. In April the winds are fresh from S. to S.W., with cloudy oppressive weather; but, once or twice during the month, there is a very hard squall from the W., which lasts for two or three hours, accompanied by heavy rain.

In May the winds are mostly from S.S.W. to W., blowing strong for several days together, with violent gusts at times, and thick hazy weather, with much thunder and lightning.

June, July, and Aug., are the months of the S.W. monsoon, during which no vessels attempt the navigation of the Gulf of Cambay with its violent tides and intricate channels. Boats run between the E. and W. coasts, watching their opportunities in short breaks in the weather, but we have little knowledge of the winds except that they blow home to the Surat coast.

In Sept. the winds are generally from S.W. to W., fresh during the first part, and light during the latter part; weather cloudy, with occasional light showers of rain.

In Oct. the winds are very light and variable, but chiefly from N. to N.N.E. The weather fine, but the sun very powerful; calms and light airs are generally experienced during night.

In Nov. the winds are variable from W.N.W. to E.N.E., with hot oppressive weather; during the latter part of the month they become pretty steady from N. to N.E. with pleasant cool nights. In Dec. moderate breezes are chiefly experienced from the N. to N.E., with fine pleasant weather. In crossing the gulf from Bombay to Diu Head, strong N.-Easters are felt.

WINDS and WEATHER on the COASTS of SIND and KATIAWAR. January.—Winds continue much the same as in Dec.; steady land and sea-breezes between N.W. and N.E.; the sea-breezes veering more to the W. Squally weather with rain sometimes occurs near Karachi. Blown sand causes a haze off the Sind and Kutch shores.

February.—Winds become more variable, the N.-Easters less frequent and of short duration; sea-breezes between W.S.W. and W.N.W., and towards the end of the month you may get a hard blow from the W. for two and three days, particularly on the N. part of the coast. A heavy sea always accompanies these breezes, and renders the anchorage off Karachi harbour very unsafe. (*See* Gales, page 800). The engineering operations for extending Manora Breakwater are obliged to be discontinued after this month, on account of the heavy swell with the sea-breeze.

March.—Land-winds become less regular; sea-breezes are more durable and generally moderate between W. and N.W., but blow very hard at times with thick misty weather. April.—Winds

much the same as last month, weather generally hazy, with a very damp atmosphere. Swell from the W. at times, heavy in the afternoons when the sea-breeze is strongest.

May.—Winds moderate from W. to W.S.W., weather hazy with very heavy dews. Clouds begin to gather, and much swell prevails from the W. at times.

June, July, and August.—The S.W. monsoon prevails, blowing moderate and fresh breezes between W. and S.W., with passing clouds and hazy weather. It becomes very cloudy as the season advances; rain is uncertain, but may be expected about the latter part of July, and is generally accompanied by variable winds and thunder-storms. A heavy swell prevails during the month of July, when the S.W. monsoon blows strongest.

September.—Winds light from W. to S.W.; squalls from the land may be expected. The weather is generally hazy and the monsoon swell not yet subsided.

October.—Winds W. to N.W., light, with occasional calms. Land-winds begin to get steady about the end of the month. Weather generally very clear and pleasant, but very dense fogs come off the land sometimes. Sea smooth.

November.—Land and sea-breezes become steady, the former from N.E., the latter veering between W. and N.W.; the land-winds, towards the end of this month, being from one to two days' duration, but not very fresh. Weather generally very clear, and objects visible at a great distance. Much terrestrial refraction prevails during this and the following months, assuming various forms. Upon one occasion the hull of a cutter, only 8 ft. out of water, was distinctly seen at 9 miles distance, apparently not more than 4 m., and the flash of her gun was plainly seen with the naked eye; sounds are also conveyed very distinctly.

December.—Steady land and sea-breezes between N.N.W. and N.E. The N.-Easters on the coast of Sind and Kutch now blow strong for three or four days at a time, but with less force and shorter duration on the Katiawar coast. Southerly winds are rare; but when they do occur, it is generally after a strong N.-Easter, and then they are very light. The weather is now cool and pleasant, with a remarkably clear atmosphere.

Winds and Weather at Colombo. January.—At the opening of the year the N.E. monsoon is at its height. Like that of the Malabar coast, it is parching and disagreeable by day; but cold, dry, and cutting at night, when, as the "*along-shore wind*," it is avoided as injurious to health, and every window is shut against it. Towards the close of the month the wind gets a little W. tendency, and occasional showers fall.

Feb. is dry and hot by day, but the nights are cloudless and cool. The wind is unsteady and shifts from N.E. to N.W., sometimes failing entirely between noon and night. Rain is rare; only two inches fall during the whole month. In March the heat continues to increase. The winds are faint and unsteady, with increasing W. tendency; partial showers sometimes fall, and thunder begins to be heard at sunset from the stacked-up clouds amongst the hills; this month has the same amount of rain as the preceding.

April is the most oppressive portion of the year, the mean day temperature being about 88°. The wind veers between N.W. and S.W. Towards the end of the month a ground-swell from the W. proclaims that the S.W. monsoon is not far distant, and the sea-breeze towards sunset brings clouds and showers.

May in the commencement is hotter than the last, and the days become more overcast; banks of clouds rise over the ocean and give warning of the approaching monsoon. At last, about the middle of the month, sudden lightnings flash among the hills, and with loud crashes of thunder the S.W. monsoon bursts over the thirsty land in a deluge, which in a few hours, overflows river banks and inundates the plains. Fortunately this violence seldom lasts more than one or two hours, and gradually abates; when a clear sky supervenes; then for some days heavy showers continue to fall at intervals in the forenoon; and the evening sun goes down in great splendour, the wind remaining steadily and fresh from the S.W. quarter. In May the greatest monthly rain-fall occurs, viz., from 13 to 14 inches.

In June the S.W. wind gains considerable strength; indeed, this is the most dangerous month for shipping in Colombo roads, on account of the heavy swell that rolls in, though few accidents are said to occur. The fishermen seldom put to sea in this month. The temperature is much reduced by the refreshing influence of the monsoon, the heat being modified by transient clouds and frequent showers; the rain-fall, however, is only little more than half that of May, July (though more boisterous than June near Bombay) is more moderate on the W. coast of Ceylon, and showers are less frequent, the amount of rain being only half that of June, and one-fourth that of the month in which the monsoon is ushered in.

Aug. and Sept. are beautiful months, with light W. breezes, which, towards the close of the latter month, begin to get unsteady and to assume a little Northing, and clouds begin to collect

The nights are always clear and cool. Sept. has twice as much rain as Aug., but not quite so much as June. There is not much swell in Sept.

Oct. has more unsettled weather, but the sea is smooth, and the wind is not strong, though it veers more to the N. There is twice as much rain as in the previous month.

In the early part of Nov. the wind veers between N.N.E. at night and N.W. by day: about the middle of the month the W. monsoon is completely over; and the N.E. monsoon is ushered in by lightning, thunder, and heavy rain, though the atmospheric disturbance is not so great as that of May. The rain-fall of Nov. is nearly 11 inches, which is a little less than is registered in the month of Oct.

In Dec. the N.E. monsoon is steady and of moderate strength, bringing with it light but frequent rains, the total quantity of which, however, does not amount to half that of Nov. In this last month of the year, as in the first, the *along-shore* land-wind is dry and cutting, and at night very injurious to those who are so incautious as to sleep in it.

The total rain-fall in the year at Colombo averages 72 inches, about nine-tenths of the quantity that is gauged at Bombay harbour; but that of the Malabar coast, intermediate between those places is much greater. Cape Comorin is an exception; *there* only half that quantity is gauged, but this may be owing to the interposition of lofty hills to the N.W. and N.; we have mentioned that rain-squalls along the Malabar coast come much from the N.W. in July and Aug. The rain of Ceylon is more equally distributed than that of India throughout the months of the year, but there are two periods of heaviest rain, the autumnal one corresponding with the Madras monsoon, and the other period, between spring and summer, corresponding with the Bombay monsoon, or rather anticipating it by one month.

Of course the W. coast of Ceylon Island presents a contrast to the E.; for, while the former is drenched, the low country to the E. of the mountain region is sometimes exhausted with dryness, but receives its rain subsequently from the N.E. monsoon; in amount, about as much as the Madras coast, or about two-thirds of that which Colombo receives. But in the extreme N. of the island the total in the year does not exceed 30 inches; there the wind of the S.W. monsoon is comparatively dry, being robbed of its moisture by the lofty intervening mountains of Travancore.

CLIMATE. The hot season in Malabar is from March to the end of May, during which the thermometer ranges between 80° and 90° in the shade; in the rainy season from 75° to 85°; and in Dec. and Jan., the coolest season between 68° and 80°. Amongst the Lakadivh Islands—away from the influence which the continent of India has in cooling the air at night, and raising the temperature in the day—the thermometer in the vessel's cabin was found to remain between 80° by night, and 83° in the day, from Dec. to March inclusive. At Bombay the temperature is much the same as off Malabar. Off the Kutch and Sind coasts, the coldest period noticed was the last week in January and the first in February, when, in the early morning, the thermometer was observed so low as 50°; in the daytime averaging 65°. It may thus be said that the Malabar coast presents a pleasant and equable temperature to passing vessels. On shore the range of the thermometer is greater; and the heated land on a calm day, before the rainy season, gives the air a rather depressing influence to the European, but the cool sea-breeze soon restores him.

The climate of India is, in reality, as various and diversified as the features of the country. In the S., showers are frequent all the year round. On the S. Coromandel coast two months of violent rain occur in winter, the rest of the year being dry; while a few degrees more to the N., on both sides of the Bay of Bengal, and all over Western Hindostan, the converse of this is the case. In central India the rain is extremely light, and occurs mostly about midsummer; in the N. there are both summer and winter rains.

In Sind and Beluchistan there is no rainy season whatever; and the heavy showers which occur irregularly, and at intervals of years, are productive of sickness and sometimes injurious to the country. It is to the floods of the river Indus, between March and September, that Sind is indebted for any cultivation. From the day the inundation of the river begins to subside, the country becomes unhealthy, and thus the latter week of Sept. and the whole of Oct. are considered the most dangerous seasons of the year. It is then that the change of monsoon takes place, and the exhalations from the swamps are most to be avoided. In Dec. and Jan. the cutting land winds, at Karachi, stir up clouds of fine desert dust, which the casual opening of a door admits into every hole and corner of the houses, and the sand plainly shows itself in every dish of food. At such times the coast is much hidden from view at sea.

The land-winds of the whole coast, below the Western Ghauts from Bombay to Comorin, are sharp, cutting, and excessively dry, so as to be unhealthy to sleep in during Nov., Dec., Jan., and Feb. Towards the time of the S.W. monsoon's approach, the air is, at times, so saturated with moisture as to throw a complete haze over the low land and distant hills: this haze is seen to be

restricted to the space between the Ghauts and the sea by the fact of its clearing away after falls of rain, when the distant mountains become again visible and clear.

FOGS. On the coasts of Sind and Kutch, and in the latter Gulf, dense banks of fog sometimes come off the land in Oct., and in Jan. and Feb., after a calm night; they drift to seaward with the land-winds, and back again with the sea-breezes, until the heat of day disperses them. In some places, on the W. coast below Bombay, there are the same fogs in Oct., but in a much less degree, and they only obscure the low land and projecting headlands about sunrise and a little after. The W. Ghauts are enveloped by dense mists, or haze, from April to Nov., which disperse occasionally for short intervals after heavy falls of rain; in the actual S.W. monsoon the atmosphere is so dense as completely to hide the mountains from view.

In the season of N.W. winds off Bombay, and along the coast to the S., the atmosphere is generally hazy, particularly in March and April; and, through this haze, the land and trees along the coast appear to be twice the distance they really are. This is especially the case during the S.W. monsoon.

PASSAGES ALONG W. COAST OF HINDOSTAN.

Working up the Coast. At the present time no vessels attempt the passage up the coast after May, until Sept., is considerably advanced. It is, however, remarkable, and evinced great nautical skill and perseverance amongst the Portuguese and English navigators of early times, that some of them effected a passage up the Malabar coast in the strength of the S.W. monsoon. The ship *Bengal Merchant* from England, on the 17th July, 1686, made the coast at Anjenga, anchored in 19 fathoms off Quilon on the 20th, and remained there some time. On the 14th Aug. she moored at Calicut; left it on the 19th, passed Mount Dilly on the 23rd, and arrived at Bombay harbour on the 7th Sept. These dates are supposed to be those of the old style, or 11 days later than the present calculation.

The passage to the N., in Sept. and Oct., is rendered tedious by adverse winds and currents on the S. part of the coast. In the middle and end of Sept., about Anjenga, the winds are at N.W., and variable, with frequent light airs, and a constant strong current to the S. This obliges vessels to anchor frequently, when the breezes fail, to prevent being driven back by the current. The weather is threatening at times, with heavy showers, and some light squalls from the sea, with the remains of the monsoon swell, setting in upon shore.

Ships from England, Cape of Good Hope, Mauritius, or Australia, or coming the Southern passage from Bay of Bengal or China, bound for Bombay—which cannot cross the line to the W. of lon. 60° or 62° E., before the beginning of Oct.—should if the wind permits, pass through the 9 degrees channel, and steer to the N. of E., until soundings be obtained on the coast of Malabar, at a depth of 40 or 50 fathoms water, mud bottom, and then haul to the N. and work up near the shore with the aid of the land and sea-winds; the former commence about the beginning of Oct. below Calicut, but do not extend far off shore until Nov. This route, however, will be found preferable to working up to the W. of the Lakadivh Islands and Shoals, where the winds are, at that same period, generally light and variable from the N.

In Dec., Jan., and Feb., the regular sea-breezes render navigation to N. up the coast very easy and pleasant; the sea is smooth near the land, the sea-breeze of course strongest near the shore, so that a vessel should keep in sight of the coast.

Ships bound to the N. in March or April, will probably experience land-breezes between Anjenga and Calicut, but to the N. of Mount Dilly these will generally fail in strength and duration. Ships ought, therefore, particularly in April, to be well out in 35 or 40 fathoms, about noon, that they may be enabled to make a long stretch to the N.N.E. with the N.W. winds. If they get in shore early in the evening, and the wind be at N.W., it will be proper to make short tacks near the land until the breeze veers to the N., which may be expected in the early part of the night; they ought then to stretch off to the N.W. or W.N.W., to be ready for the sea-breeze of the following day, as there will probably be no breeze of any consequence from the land. If the wind continue brisk, a ship will generally gain ground or hold her own during the night; but if, after a N.-Wester, it falls to little wind, with a chopping sea and a drain of current setting to the S., she ought to anchor with a kedge or stream to prevent losing ground.

Late in March, or in April, when a strong N.-Wester sets in, it is liable to continue two or three days, or longer, rendering it impossible for a ship to gain any ground, when working near the coast. At such times it is advisable to stand out to sea about 60 m. or more, where these winds are generally moderate and the sea smooth, which will enable her to gain ground and make a better

passage to Bombay than by persevering to work against the chopping sea and drain of adverse current which generally prevail near the shore when the N.-Westers blow strong.

In April, the weather becomes hazy; and at times cloudy over the land in the evening, with light showers. In this month the passage up the coast is very tedious, owing to the strong N.-Westers. In some years, however, strong S. winds have been known to blow along the whole extent of the coast in April, which continued for several days. Ships have been known to sail from ports to the S., at the commencement of these S. winds, which carried them to Bombay in five or six days; but such instances are uncommon, for S. winds seldom happen in April, except such gales as are mentioned under that head (at page 300).

When a ship bound to Bombay, is on the S. part of the coast, late in April or May, if the wind be favourable with steady weather, she may steer to the N., keeping a good offing towards the Lakadivh Islands. Being clear to the N. of these islands, she ought, if the weather is unsettled and cloudy, with variable winds, to endeavour to obtain a greater offing, in order to have good sea room in case a gale should happen. If the weather is favourable, an equal advantage will be obtained when she is between 100 and 200 m. from land, as the sea is there more smooth for working than in-shore, where a short chopping sea usually prevails, and a drain of current setting to the S. during strong N.W. winds.

If a ship be on the S. part of the coast below Mount Dilly in May, and meet with N.W. winds, she ought to stretch off without loss of time to the W. of the islands by passing to the S. of Seuheli-par, between it and Minicoy (*see* that page), or through any of the Lakadivh Islands; she will there be ready to benefit by the approaching W. winds, or to take every advantage of the shifts should they continue from N.W. and N. Many of the small coasting vessels make excellent passages up the coast at this season; but the natives have an advantage in a thorough knowledge of the coast winds and tides, and, in case of urgent necessity, or as night comes on, have so many little rivers and ports to run into.

Bombay to Diu and Karachi. As Diu Head, and the mountains inland of it, are the only land-marks on the south coast of Katiawar that the navigator wishes to sight, when bound from Bombay to any ports W. and N. of Diu, it will be well to give here a few general directions for the passage from Bombay to Diu Head, according to the season.

In Sept., when the remains of the S.W. monsoon swell will still be felt, and in Oct. (which two are the months of light variable winds between the monsoons), N.W. winds are general, and there will be no advantage in keeping near the Indian coast much to the N. of Bombay, but a nearly direct course from Basseen towards Jafrabad should be made. Nov. is a very calm month along the S. coast of Katiawar; and, if proceeding to the W., a ship should anchor on the flood to avoid being swept into the Gulf of Cambay.

After the above months and throughout the N.E. monsoon—Nov., Dec., Jan., and Feb.—a ship should work with the land and sea-breezes up the coast above Bombay, and sight Sunjan high land before starting across to Diu Head, as the wind generally hangs much to the N. and N.N.E. across the mouth of the Gulf of Cambay.

In March and April, when N.-Westers prevail on the coast of India, and the land-wind is light and uncertain, little is gained by keeping in with the land, but a nearly direct course should be taken from Salsette to Diu, remembering the set of the tides, and taking advantage of the shifts of wind to make Northing. By attention to the soundings and the chart, the navigator may easily know his position, and avoid being swept into the gulf; for S. or S.S.W. winds often happen at Surat, and on the Malaiki Banks, after the middle of April and early in May, frequently blowing fresh during the springs; particularly during the night with the flood tide, and producing a considerable sea, which drives a vessel rapidly towards the Malaiki Banks.

In May and early in June, on leaving Bombay, every slant of wind should be profited by to make Westing, so as to be able, when the S.W. monsoon fairly begins, to weather Diu Head by 100 m. if bound into the Gulf of Kutch, or by 200 m. if for Karachi. The Kutch boats, called Kotiyeh, after delivering their last cargoes of cotton at Bombay in the end of May, frequently manage a passage from Bombay to Kutch Mandavee in six or seven days, profiting by a thorough knowledge of the tides of the Gulf of Cambay, and knowing well how to make the young S.W. monsoon a leading wind along the whole W. coast of Katiawar.

In the first part of the S.W. monsoon, there is a strong drain of current into the Gulf of Kutch, which, without nullifying the ebb stream, makes that of the flood very much more swift; for the sea water is then propelled by the W. wind many miles over the Runn of Kutch, causing that level plain, at that season, to be a vast inland sea, traversable by boats, instead of beasts of burthen, as in the opposite season.

During the S.W. monsoon, vessels bound to Karachi should be careful not to make the coasts

of Sind or Kutch below their port, partly because there is a set to the S.E., and partly because the wind is liable to lull occasionally; for it has been observed that the monsoon does not always blow home to the coast, so that, with a heavy swell and lee current, they might have to bear up for Bombay again.

Passage down the Coast. Ships from Karachi, bound to the S. along the coast of India, have favourable winds almost all the year round, and need only to be reminded of the indraught into the Gulf of Kutch from March to Sept.; they should therefore give a wide berth to the shoals at the entrance to that gulf. If leaving Karachi in the S.W. monsoon, a vessel, so soon as clear of the bar, should work off to the S.W. into 15 or 20 fathoms water before shaping a course to the S. In passing the Munneja Bank, she should not be in less than 20 fathoms, and never decrease that depth along the Katiawar coast. If bound to Bombay, it is well to know that nearly a straight line from Diu Head to the offing by Bombay is the 20 fathoms line: so that a vessel, by her lead and soundings alone, will make Bombay when approaching from the N. by simply keeping in the 20 fathoms line of soundings.

Ships bound round Cape Comorin to the Bay of Bengal, sail from Bombay, or from any port on the W. coast of Hindostan, in every month of the year, and may keep at any convenient distance, giving attention to the few outlying dangers which are noticed in this work. In the first part of the S.W. monsoon, they should get into 50 fathoms off Bombay, if the wind hangs much at S.W., before running down the coast.

Directions for working out of Bombay Harbour are given in the chapter about that place; it is therefore only necessary to premise that ships passing along the edge of the bank of soundings in the strength of the S.W. monsoon, should be always prepared for stormy weather, because the squalls are often of long continuance, and very severe: at other times fine weather may be experienced, with intervals of light breezes. Late in June some ships, in 45 and 50 fathoms water, have been unable to make any progress to the S. for several days together, by the wind blowing in severe squalls from S.W. with a high sea: others, with indifferent sails bent, after splitting them have been nearly driven ashore, and two fine ships were really driven on it and wrecked several years ago. By carrying a press of sail during the squalls, many ships have lost a lower yard or top-mast; it is therefore prudent, when the weather seems to be setting in severe, for a large ship to make snug, by taking a reef in her courses.

Soundings along the Coast. It may be well here to remind the navigator that, in running down the Malabar coast, the projecting points are Viziadrug, Vingorla Rocks, Pigeon Island, Mount Delly, Sacrifice Rock, Alipee, Quilon Reef, Ruttera, and Cadiapatam (off which lies the Crocodile Rock.) It may be noticed that off Bombay and Thull the 30 fathoms line is 25 m. from the land, whereas off Choul and Angenwil that depth of water is 40 m. from the shore. Off Viziadrug again, 30 fathoms is found at the distance of 16 m., off Pigeon Island at 30 m. from the main land, and off Mangalore at 20 m. From Mount Delly towards the S. the bank of soundings does not extend so far off shore as near Bombay. The following statement of the depths off particular places, may be useful to vessels running down the coast.

Off Vingorla Rocks (which are in the line of 15 fathoms,) the depth of 20 fathoms is found at 4 m. from them; and 30 fathoms at 12 m. Pigeon Island (which is in the line of 17 fathoms) has 20 fathoms 1 m. outside of it; 30 fathoms at 20 m.; and the edge of the bank at 60 m. Off Mount Delly, there are 10 fathoms at 3 m.; 20 fathoms at 8 m.; 30 fathoms at 14 m.; and the edge of the bank at 40 m. Off Cotta Point, there are 10 fathoms at 3 m.; 20 fathoms at 8 m.; 30 fathoms at 25 m.; and the edge of the bank at 40 m. Off Ponany, there are 10 fathoms at 5 m.; 20 fathoms at 11 m.; 30 fathoms at 18 m.; and the edge of the bank at 30 m.

Off Alipee, there are 10 fathoms at 8 m.; 20 fathoms at 12 m.; 30 fathoms at 18 m.; and the edge of the bank at 30 m. Off Quilon, there are 10 fathoms in foul ground, 3 m. from the point; 20 fathoms at 5 m.; 30 fathoms at 14 m.; and the edge of the bank at 28 m. Off Ruttera, there are 10 fathoms $\frac{1}{2}$ m. from the coast; 20 fathoms at 2 m.; 30 fathoms at 7 or 8 m.; and the edge of the bank at 26 m. Off Cadiapatam.—The line of 10 fathoms is by the rocky islets of Kotah and Adumdah; the Crocodile Rock is in the line of 16 fathoms, and 20 fathoms is found very close to it; 30 fathoms at 13 m. from the main land; and the edge of the bank at 37 m. Off Comorin.—The edge of the bank of soundings extends in a radius of 55 m. to the S.W. and S. Beyond it there is very deep water towards Point de Galle.

From Bombay Harbour to Viziadrug, the direction of the coast is S. by E., the latter being a projecting part of the land; onwards to Vingorla Rocks, it is the same line of bearing; afterwards its general direction is S.S.E. to Mount Delly and Quilon (the coast between these two latter places forming a considerable bight, as also it does between Vingorla Rocks and Mount Delly,) and from Quilon more E. to Cape Comorin. The best track, after getting an offing, is to keep on the edge

of the bank of soundings in from 40 to 50 fathoms; more particularly in June and July it is prudent to keep well out from the coast, to give a berth to the several islands and rocks.

It is of little consequence whether a ship get out of soundings or not, until she approaches the head of the Lakadivh Islands; but, after reaching lat. $12\frac{1}{2}^{\circ}$ or 13° N., care must be taken to obtain soundings, if not certain of your position by chronometer, that you may be able to shape a course to pass inside of Elicalpeni Bank. This bank lies in lat. $11^{\circ} 13' N.$, lon. $73^{\circ} 57' E.$, having only 6 or 7 fathoms water, rocky bottom, in some places, and so little a depth as $3\frac{1}{2}$ fathoms has been reported, (though *doubtful*) and it is distant from Mount Delly about 80 m. A large ship would probably strike on it when the sea runs high in the S.W. monsoon; it ought therefore to be avoided. About mid-way between Mount Delly and this rocky bank, there are soundings of 65 and 70 fathoms, but a little further out no ground.

As you proceed to the S., the wind will generally become more favourable, veering to W. and W.N.W., with a current setting to the S. at the rate of 15 or 20 m. daily, and sometimes stronger. On the S. part of the coast, between Cochin and Cape Comorin, the S. currents and W.N.W. winds prevail greatly during part of July, Aug., Sept., and part of Oct.

Having entered the channel between the Lakadivh Islands and the coast, continue to steer along on the edge of soundings, or should you get off the bank it is of no consequence, as the soundings do not extend so far from the coast to the S. of Calicut as they do farther to the N. The land may also be approached with greater safety, the squalls being less severe, and the wind more favourable; but it is still advisable not to come under 30 fathoms unless you are to touch at some place on the coast. This ought to be done with caution, for a ship intending to stop at any port of this coast, except Narakel or Alipee, in the S.W. monsoon, should anchor a great way out, prepared at all times to put to sea on the appearance of threatening weather.

If you get observations for latitude and longitude, in proceeding from Bombay to the S., and your distance from the land be correctly ascertained, it will seldom be requisite to sound, particularly when you have passed Elicalpeni Bank. You may then steer about S.S.E., and S. by E. $\frac{1}{4}$ E., as circumstances require, keeping from 20 to 30 m. from the coast, in the early part of the monsoon, until you are abreast of Cape Comorin; but, in steady settled weather in Aug., it may be approached within 10 or 15 m. at discretion.

When abreast of Quilon, the coast takes a direction more to the S.E., and you may from thence shape a course for the S. end of Ceylon, taking care to allow for an E. current, which sometimes sets into the Gulf of Manar. The *Gunjavar*, crossing from Cape Comorin in Aug., bound to China, experienced a current setting into the Gulf, and, having steered mostly S.E. by E., she sighted the Haycock (a hill 20 m. to the N. of Point-de-Galle) bearing E. by N. $\frac{1}{4}$ N. at day-light; as there was little wind, with a heavy swell, she was obliged to anchor in 34 fathoms, about 4 or 5 m. off shore; shortly after, squally weather set in from S.S.W., which forced her to carry a press of sail, whereby she broke some of her chain-plates, twisted the head of her main-mast, and was four days beating round Point-de-Galle, sometimes under close-reefed topsails. The East India Company's ships, however, often got into the Gulf of Manar by mistake above a century ago, and seldom experienced difficulty in escaping from it. The journals of other vessels show that the winds along the S.W. side of Ceylon in the end of July, were much the same as experienced by the *Gunjavar* in Aug., namely, between S.W. and S.

BRITISH INDIA TO AND FROM PERSIAN GULF.

Bombay to the Gulf. In Sept. and Oct., which are the months of light variable winds between the monsoons, the passage is tedious; light N.W. winds are general. There will be no advantage in keeping near the Indian coast to the N. of Bombay. In Sept., the remains of the monsoon swell will be still felt.

If bound to Maskat, a course as nearly direct as possible should be made to that place, but if bound to the Gulf direct, a ship should not make the Arabian coast, but keep more to the N. on the Mekran side of the gulf of 'Ohman.

N.E. monsoon. In Nov., Dec., Jan., and Feb., the passage is facilitated by the N.E. monsoon. A ship should keep to the N.W., not far from the Katiwar coast, till in lat. 23° or $23\frac{1}{2}^{\circ}$ N., when she may stand across to the W. In the N.E. monsoon the weather is generally fine and clear, and breezes from moderate to strong (4 to 6); but with the gulf of Kutch open, N.E. squalls with heavy rain sometimes occur. Strong S.W. or S.E. winds have been experienced at the same time, of short duration. The E.I.C. sloop of war *Elphinstone*, from Bombay to the Gulf, Dec. 17th, 1831, 120 m. to the W. of Dwarka, experienced a heavy gale from S.E. and N.E. to E. The E.I.C. steam-frigate *Ajdaha*, from the Gulf to Bombay, when 60 or 70 m. S.W. of Dwarka, experienced

strong S.W. winds for twelve hours, shifting in a violent squall to N.E. with heavy rain, on Feb. 3rd. 1857. We have mentioned (*see* page 212) that, near Maseera Island on the Arabian coast, fresh S.E. winds prevail in Feb. and March; there may be some connection between these and the winds just described.

The N.E. wind may possibly be carried quite to Maskat or Ras-el-Kuh, if a *nashi* is blowing in the gulf of 'Ohman; more probably, the N.E. wind will be lost about lon. 62 or 63° E., and after a small zone of variable winds, a N.-Wester or light N.W. winds in the gulf of 'Ohman will follow. A vessel would probably either have light airs with lee current (S.E. perhaps 30 m. a day,) or a strong N.-Wester (either of which would render her passage up the coast very tedious,) she should not attempt to close the Arabian coast till Maskat bears to the S. of S.W. The E.I.C. brig *Palinurus* (a dull sailer) in Dec., 1847, was twelve days working up from Shehab to Maskat, a distance of only 60 m. If bound to the Gulf direct, a ship should not approach the Arabian coast at all, but keep nearer to the Mekran coast.

In March and April, when N.-Westerers prevail on the coast of India, and the land-wind is light and uncertain, little is to be gained by keeping in with the land. A ship should make a direct course across, taking advantage of every shift of wind to make Northing.

In May or early in June, on the contrary, on leaving Bombay, every slant of wind should be profited by to make Westing, so as at any rate to be able to make the passage when the strong S.W. or W.S.W. winds set in at the beginning of the monsoon. Heavy gales from the S.W., in anticipation of the monsoon, are sometimes experienced in these months. The S.W. monsoon will set in early in June generally, with thick weather, heavy squalls, and rain; it sets in somewhat sooner on the S.E. coast of Arabia than in Bombay. Very bad squalls from W. and N.W., and unsettled weather, are experienced sometimes in May on the coast of India; after which there is a period of light winds and unsettled weather, with frequent S.W. sea-breezes in the afternoon, lasting for three days at a time, till the setting in of the S.W. monsoon early in June.

On the coast of India in May, or early in June, gales from S. and S.E., approaching a hurricane in force, are sometimes experienced off Bombay. All ships leaving Bombay in May, though it may be fine when they start, should be prepared for meeting the first burst of the monsoon before reaching the Persian Gulf. On June 8th, 9th, 10th, 1836, the E.I.C. sloop of war *Ternate*, experienced a heavy gale, when 180 m. E. by N. of Ras-el-Hadd, was partially dismasted, and threw her guns overboard.

Leaving Bombay for the Gulf in June (after the S.W. monsoon has set in,) in July and Aug., it is the practice to make what is called the Southern passage; *i.e.*; running down to the S.E. trade on the S. side of the equator, to make the Westing.

We are not aware of any case on record of a sailing-vessel beating straight across, which left Bombay between the 15th of June and the end of July. It has been repeatedly done by ships leaving early in June, or in the beginning of Aug. Steamers have always been able to steam straight across from Bombay to the Persian Gulf, keeping somewhat to the N. of the direct passage. A large, fast-sailing ship, would probably be able to make the direct passage at any time. Very heavy weather and hard squalls would be experienced with a very high sea, and she would take advantage of any change in the direction of the winds to make Westing. The monsoon in some years is much heavier than others, and there are often breaks of moderate weather of uncertain duration. Probably she would do best between 20° and 23° of lat.; farther to the S. she would get heavier weather, while on the other hand it would not be prudent to get too near the coast, where there would be a heavy swell and lee current; the monsoon also does not always blow home; so that she might have light winds, which would prevent her beating against the swell and current.

The Southern Passage, a distance of about 4,000 m. (while the direct distance is only 840,) averages from thirty-five to forty-five days to Maskat. The soundings will be a sufficient guide for the distance off shore, on working out of Bombay Harbour. When in 15 fathoms or upwards, you may stand down the coast; it is proper to keep in soundings of not less than 30 fathoms, which is quite near enough to the coast, and yet not to deepen off the bank of soundings altogether; 40 to 50 fathoms would be a very suitable line of depth. The reason is, that if no observations are obtainable by keeping on the bank of soundings, there can be no danger of running on the E. dangers of the Lakadivh group. After reaching lat. 10° N., it is best to make as little Easting as possible, as the S.E. trade is found nearer the line by the Maldives, than in the meridian of Ceylon. The weather will be overcast and thick, so that possibly no observations may be obtained for two or three days, with heavy showers and hard squalls at W. and W.N.W.; the wind being from S.W. to W.S.W. It will be more from the W. and W.N.W. in Aug. than in the two former months. A current will generally be experienced setting to the S.S.E., especially in July and Aug., between the head of the Maldives and Ceylon, of 20 to 30 m. a day.

In lat. 5° N. the weather will begin to be finer and more moderate. The equator will be

crossed in from 77° to 79° E. lon., with light winds, cloudy weather, possibly rain, with occasional calms; the wind varying from W. to S.S.W., and sometimes an E. current. This weather will continue till in lat. 3° or 4° S.; or till the S.E. trade is fallen in with. In July or Aug., probably no trade-wind will be experienced before reaching lat. 5° or even 6° S. E.I.C. schooner *Mahi*, in July, 1850, got the S.E. trade in 1° S., having crossed the line in $75\frac{1}{2}^{\circ}$ E.

In June, according to Captain Horsburgh, the S.E. trade would be fallen in with in lat. 5° S., in which case the Westing may be run down in that latitude; but in general, vessels pass to the S. of the Chagos Archipelago, which appears the preferable route at all times. Diego Garcia is sometimes sighted, but the cocoa-nut palms being only visible about 15 m. from aloft, this island is often passed without being seen.

On getting the S.E. trade, a course should be shaped for Seychelle Islands, about W. by N. The breeze will be steady and strong, with fine weather, and W. current. Captain Horsburgh recommended running one or two degrees to the W. of the meridian of Ras el Hadd, before steering to the N., but Captain Constable says that probably much time would not be lost by sighting one of the Seychelle Islands for a fresh departure. This would be two degrees further W., but then the S.W. monsoon would be a little more free for the extra distance. We prefer our old route, and would only call at Seychelles for water or news from Europe.

The line should be recrossed in 56° or 57° lon.; the trade-wind will be carried as far as the line, veering gradually to S. and S.W. The weather will be moderate till in about 4° N., when the S.W. monsoon will increase in strength, reaching its maximum force in lat. 10° to 12° N.; when it will be between a moderate and a fresh gale (7 to 8), with gusts, and a very heavy sea, weather hazy. On the parallel of Sokotra probably the meridian of 58° will be the best distance off it, as the weather and sea are always worse nearer that island; between 54° and 56° also, a S.W. counter current of 30 m. a day will be sometimes experienced, while, on the other hand, it is not advisable to be too far to leeward in case of the monsoon hanging to the W.; the heavy sea and E. current must also be considered. From the equator an increasing N.E. to E. current will be experienced; off Sokotra, probably to the E. 30 or 40 m. a day.

The weather will be moderate and more hazy, as the latitude of Ras el Hadd is approached, the land below which should not be made. As soon as Ras el Hadd bears S., the monsoon is quite lost, and light variable winds with a N.W. current, or a moderate S.E. breeze succeed it, with a swell following round the cape. Immediately on rounding the cape, the sudden change from the pleasant cool weather of the monsoon, to the damp stifling heat of the Persian Gulf will be severely felt, and the precaution should be taken of keeping the men out of the sun.

The Persian Gulf to Bombay. The winds are favourable throughout the year, when clear of Ras el Hadd. In the N.E. monsoon or fine season (from Oct. to April or May), the wind is mostly favourable for getting out of the Gulf of 'Ohman; the current, if any, setting to the S.E., and N.W. or N.E. winds prevalent. In the fine season, the best passage is made by keeping to the N. of the straight course, so as to pass near the Katiwar coast, where the N.E. wind is stronger, or after March, N.-Westers will be experienced.

In the S.W. monsoon, when light S.E. winds or calms are common, with a heavy swell rolling up from S. or S.S.E., round Ras el Hadd, and the current on the Arabian coast setting to the N.W., it is somewhat tedious to get clear of the Gulf of 'Ohman. In this latter season, the monsoon will be experienced in lon. 60° E., blowing at first from S., or even S.S.E., and veering to S.W. and W.S.W. as the longitude is increased. A course should be shaped so as to be on the parallel of Khundari (Kenery), when in about 40 fathoms; that island being the point easiest to make in thick weather. (See Remarks about Bombay Harbour.)

The vessel will have steady monsoon weather with a heavy sea, and perhaps squalls, till on the edge of the bank of soundings, where the sea is said to be always worse, and rain squalls with thick weather, will be the rule. A current of 12 to 15 m. a day will be experienced, setting to E. and S.E. Frequently no observations will be obtained the last two days of the passage.

India to the Persian Gulf. In the S.W. monsoon, a vessel leaving any part of India S. of Bombay, would have to make the Southern passage. In the N.E. monsoon, her best course would be to work up the Malabar coast with the land and sea-breezes, and proceed as though leaving Bombay, across to Diu Head. Along Katiwar coast the N.E. land wind is fair to Dwarka Point, from which she may take a fresh departure, and make the Mekran coast about Gwadur.

In March, April, or May, when the land-winds on the Malabar coast are weak, it would be better to make as direct a passage across as possible; as working up the coast would then be no advantage, in fact, the reverse, as the N.-Westers set in about the middle of March, and strong W. and W.S.W. breezes blow on to the Sind and Kutch coast, even in the latter part of Feb.

Red Sea to the Persian Gulf. In the S.W. monsoon, after clearing the Gulf of Aden,

and getting the monsoon in lon. 51° E., a vessel would have no difficulty in running up the Arabian coast. She should not be too close in, as the weather is hazy; and very near the land the wind sometimes falls light. The current sets to the N.E. along the coast.

In the N.E. monsoon the passage is very tedious, with a constant lee current. Vessels have, however, occasionally worked up the coast against it to Ras el Hadd. It would take about six weeks. During these months sudden gales from the N. to N.W., called Belats, are experienced near the coast, only between Cape Fartak and Maseerah Island; these are frequently succeeded by strong S.E. winds. It is unwise therefore to make the passage along the Arabian coast from Aden to the Gulf during the N.E. monsoon. Strong S.W. gales have been experienced in Kooria Moorla Bay, lasting six days in Feb. and March. We have already suggested (page 312) that there may be a connection between these gales and the short gales from S.W. and S.E., experienced in Feb., about 100 m. to the S.W. of the Gulf of Kutch.

PASSAGES TO AND FROM THE RED SEA.

If bound to **Red Sea** from **Bombay**, or any port on the N. part of the Malabar coast, in Nov. and Dec., Jan. and Feb., a ship should steer for Ras Fartak on the Arabian coast; passing about 80 m. S. of it; and coasting thence to Aden. A good look-out is necessary, but the lead is no use where the shore is so deep-to. Fartak is visible 40 m. A speedy passage may be expected.

In March and April, the winds are less constant than in the four preceding months, often veering between N.N.W. and N.N.E. in alternate brisk and light breezes, with calms at times, and settled pleasant weather. In these months, a ship should steer a course from Bombay to pass S. of Socotra, for early in April the N.E. monsoon is nearly expended about this island, also on the coast of Arabia, and is succeeded by light breezes from S.W. and W., with frequent calms. The current also begins to set strong to the N. about Socotra, and between it and Ras Guardafui; it is therefore prudent, about the latter part of March, or early in April, to pass about 50 m. S. of Socotra, to be enabled to reach Guardafui with the S. winds, which may then be expected. Some ships which leave Surat late in March, made the E. end of Socotra in mid-April; one of them kept working in sight of that island 14 days, with S.W. winds and calms, and was in danger of losing her passage, the current being constantly against her. The other ship stood with W.S.W. and S.W. winds to the S. of lat. 3° N., got the wind favourable, and had from thence a quick passage. The *Latham* sailed from Surat in April, and arrived at Mocha 12th of May. She went as far S. as lat. 10° N., had light variable winds, mostly from N.E. and S.E., and strong currents, setting N., approaching Ras Guardafui; she made the land in lat. $11^{\circ} 12'$ N., and had that day 84 m. of N. current in running along the coast of Africa. The *Gunjavar* of Surat left that place the day after the *Latham*, saw Socotra, and fell in with the *Latham* off Cape St. Peter. Although the *Gunjavar* sailed well in light winds, it was imprudent to make Socotra so late in the season.

If a ship sail from Bombay or Surat in April, she ought certainly to steer to the S.W., to be able to pass well to the S. of Socotra; for, if not able to weather that island with the S.W. winds, it is probable that, to save the passage, she will be obliged to stand nearly to the equator, before she can reach Africa on the other tack. Late in April a ship from Bombay must get below lat. 10° N., when S. of Socotra, so as to be able to steer N.W. for Cape Guardafui; for at this late period she will probably meet with S.W. winds long before the coast is approached. The coast may be made anywhere between Ras Hafoon and Ras Shenareef, but the deep bay to the S.W. of the former cape should be avoided, as the danger is great, if a ship get into this bay with strong S. winds, or in the night. (See page 108). Having seen the land, it will be prudent to pass close round Ras Guardafui; if April be far advanced, keep along the coast to Burnt Island, and then steer over for Cape Aden. In May, June, July, and August, when S.W. and W.S.W. winds blow strong, it may sometimes be tedious beating along the coast of Africa, from Cape Guardafui to Burnt Island, but it is proper to persevere, by working near the coast until up with the Island and then cross over for Aden. A ship that sails well, may work up from Aden to the Straits of Bab-el-Mandeb, during the strength of the W. monsoon, if every advantage is taken; particularly on the springs, when the current is liable to change and set to the W.: the wind at such times is also subject to small changes; or in these months a quicker passage may sometimes be made, by keeping near the African coast till about 20 leagues W. of Burnt Island, then cross over for Straits of Bab-el-Mandeb, or as near to them as the wind will admit.

Ships which sail from Bombay after April must proceed by the Southern passage, and run down the westing in S. latitude. They will have strong S. winds on the E. coast of Africa about Ras Hafoon, if they make the land there during the S.W. monsoon. In beating from Cape Guardafui to Burnt Island, ships should have good sails bent in June, July, and August, for the wind

frequently blows in severe gusts. Some ships, in these months, have returned to Bombay, thinking it impracticable to beat up to the Straits of Bab-el-Mandeb; but it may be effected by a good sailing ship at all seasons, if she is well fitted with sails and other requisites. In May it is moderate, and generally blows more from S., making progress to W. along the African coast less difficult than in subsequent months. Ships may also cross over for Aden with greater confidence in May than at a later period.

The Southern Passage. It is usual after the setting in of the S.W. monsoon for sailing vessels bound from Bombay to Aden and the Red Sea, to make what is called the **Southern Passage**, or to run down S. of the equator into the S.E. trade to make their Westing. After working out of Bombay harbour into 15 or 20 fathoms of water, a vessel may steer down the coast keeping in soundings of from 40 to 50 fathoms; this is advisable to prevent running on to the E. dangers of the Lakadivh group, as owing to the thick, overcast, rainy weather that may be expected, observations may not be obtainable for days together. After passing these islands, as little Easting as possible should be made, as the S.E. trade is fallen in with sooner to the W. than to the E. The wind will be from S.W. to W.S.W. with hard W. and W.N.W. squalls accompanied by heavy rain. A current to S.S.E. of from 20 to 30 m. a day will be experienced.

As the equator is approached, the weather will be finer, and the wind more moderate; and on the equator light air and calms, with cloudy weather, and possibly rain will be experienced. This weather will continue until the S.E. trade is fallen in with, which is generally in from 5° to 6° S. lat., but it is sometimes met in lat. 1° S., at others not to the N. of 7° S. or even 8° S. lat. A vessel may run down her Westing as soon as she is fairly in the trade-wind, but generally vessels are obliged to pass to the S. of the Chagos archipelago, making what is called the **long S. passage**. On getting the S.E. trade, a course should be shaped for the Seychelle Islands, one of which may be sighted, for a fresh departure. The equator should be recrossed on the meridian of 53° or 54° E. The trade-wind will be steady and strong with fine weather, and carried as far as the equator, gradually veering to S. and S.W., continuing moderate till in about 4° N., when the S.W. monsoon will increase and reach its greatest force in about 10° N.

After crossing the equator, a course should be shaped to make the African coast between Ras Hafoon and Cape Guardafui, due allowance being made for the strong N.E. current which will be experienced on nearing the coast, and the Cape must be rounded close, to prevent being set to the N. As before stated, vessels should keep close to the African coast until Burnt Island is reached, when they should steer for Ahden. A ship that sails well may work up from Ahden to the Straits of Bab-el-Mandeb, during the S.W. monsoon, if every advantage is taken, particularly on the springs, when the current is liable to change and set to the W.; the wind at such times is also subject to small changes: or in these months a quicker passage may sometimes be made, by keeping near the African coast till about 60 or 70 m. to the W. of Burnt Island and then crossing over for the Straits, or as near to them as the wind will admit.

Steamer track from Bombay to Aden. It is useless to attempt the direct passage from Bombay to the Gulf of Aden during the S.W. monsoon months, or from early in June to the end of August, either by steamers or sailing vessels. There is no record of any vessel having succeeded, though some have tried it. The East India Company's steamer *Akbar* attempted the direct passage in June 1846, but was obliged to bear up for Bombay with her cutwater damaged. The East India Company's steamer *Feroze* tried it in July 1849, but finding the wind and sea increase as she advanced to the W., so as to require four men at the helm, and the decks being constantly flooded, after four days she bore up to the S., and made the usual steamer Southern passage.

The probably shortest track for full-powered large steamers from Bombay to Aden during the months of June, July, and August, is that laid down in the Wind and Current Chart, published by the East India Company, about 20 years ago; but that track was adopted for the purpose of expediting the mails, and the extra wear and tear was taken little account of. But we cannot recommend that route to merchant vessels. After making an offing of 50 m. or 100 m., or more if the weather be moderate, a course between S.S.W. and S. by W. $\frac{1}{4}$ W. from Bombay, may be made under steam and fore and aft sails, until the 9th parallel is reached, when they enter what is called the **soft place in the monsoon**, where the wind becomes light and the water smooth, and by steam alone the Westing can be made, till near 60° or 61° E. lon., and lat. 6° or 7° N. The vessel may then be eased off to the N.W. under fore and aft sails, and when within a day's run of Cape Guardafui, she may be able to set reefed square sails. Care should be taken to avoid the strongest portion of the whirling current to the S. of Sokotra, by not going to the N. of the 10th parallel till past the 53rd meridian, and allowance must be made for the N.E. current near the coast.

No danger need be apprehended in making the land N. of Ras Hafoon in the night, as the water gets smoother, and alters its direction and comes from the E. of the S. quarter when the meridian

of that cape is past. As before remarked, the atmosphere near the N.E. point of Africa is generally hazy, and the land consequently not visible till very close, sometimes within 20 m.; the best signs of being near the land are the change in the colour of the water in the daytime from blue to dark green, and by night the alteration in the direction of the swell caused by the prominent Ras Hafoon. The steamer *Parnassus* was wrecked in July 1872, just to N. of Ras Shenareef; we therefore strongly advise all ship-masters to press upon their officers the importance of noticing the direction of the swell and wind also, as the vessel nears Cape Guardafui.

Steamers of small power, now plying in such number between Europe and the East Indies, must not rashly attempt the above track, which was adopted by the powerful man-of-war steamers of the Indian Navy, carrying a great spread of canvas which required the attention of a full crew; they carried the English mails against time. But small steamers must reckon on a long voyage between Indian ports and the Red Sea, during the S.W. monsoon. They should get an offing of 50 m. and more, and then under steam and fore-and-aft sails, edge away to the S.S.W., keeping their luff, and be satisfied if they weather the Lakadivh dangers by 60 or 80 m. As lat. 10° N. is approached (sometimes in 11° N., at other in 9° N.) the wind and sea will be found decreasing, they should then steam to the W.S.W. head to wind, through the soft place in the monsoon. Remember that the object is now to make Southing as well as Westing. If the wind hangs to the W. by S or W.S.W., and it freshens, rather let the vessel make Southing under fore-and-aft sails, than try to hammer against the wind; but when the wind is moderate, Westing should be made. The Indian Navy steamers of small power used to commence their Westing about 8° N., and not bear away for Guardafui till in lat. 5° N., and lon. 58° E. Some good passages were made by edging away under fore-and-aft sails when in the lat. of Cape Comorin and the lon. of Ras-el-Hadd, and steering for Guardafui; thus they fetched the E. end of Socotra, steamed along the N. shore of that island, and when the wind burst upon them again from (perhaps) S.W., they again set fore-and-aft sails. Certain that, as they make their Westing now, the wind would haul to the S., they made a curved course for about 150 m., commencing at W. by N., and ending at S.W., when they were about 50 m. to the N.W. of Cape Guardafui; there losing the wind, they steamed along the African coast till Aden bore N.W.

N.E. MONSOON. The season for the passage from Bombay to Red Sea is from Oct. to April. Ships bound to Red Sea, from Anjenga, Cochin, Calicut, or other ports on the S. part of Malabar coast, may steer directly to the W. as most convenient, either to N. or S. of Lakadiva Islands, in Nov., Dec., Jan., and Feb. Ships departing from Cannanore or Mangalore should pass to the N. of all the islands. In March and April, as the winds for 500 m. away from the coast of Malabar are from N. to N.W., it is proper to keep near the land until N. of Mount Delly, and pass to the N. of the islands and shoals. Ships sailing from Cochin, or Anjenga, ought to pass near Kalpeni and Seuheli-par, if the Nine-Degrees Channel is adopted, as the current generally sets to the S. in these months. When clear of the islands, in Nov., Dec. and Jan., and Feb., steer for Ras Fartak on Arabian coast. Late in March, or early in April, it is prudent to keep to the S. in lat. 9° or 10° N., as winds admit. In April, they generally prevail between N. and N.W.; a ship must then keep near the wind, making a short tack to N. at times, before reaching the meridian of the E. point of Arabia. During this month there can be no reason for proceeding to the S. near the equator; but in May, when the S.W. monsoon may be daily expected, it is prudent to keep well to the S. Late in April, or early in May, when a ship has approached within 200 miles of the African coast, she will generally meet with S.W. winds, which draw more to the S. near shore; she must then make the coast S. of Ras Jar d'Afoon: for by falling to leeward of Socotra, the passage becomes uncertain; to save which, she might be obliged to stand on a wind to the S. and cross the equator to obtain sufficient Westing.

Ships bound to Red Sea from E. parts of India, should, before April, pass round Ceylon, and along the W. coast to Calitura, or Colombo; then pass through the Nine-Degrees Channel, as already described for ships sailing from Cochin or Anjenga. In April, W. winds being prevalent off the S.W. part of Ceylon, it is often difficult and tedious getting round it; these W. winds are also adverse for reaching the Nine-Degrees Channel; ships therefore bound from the Bay of Bengal after March, ought to adopt the long Southern passage when bound to Red Sea. They would run into lat. 9° or 10° S. to the S. of Diego Garcia, where the winds will be found more favourable in the early part of the season for getting to the W., than in the other, or *short Southern route*, between the Maldives and Speaker Bank.

Departing from the Red Sea is often difficult, and seldom attempted from Sept. to April, when the E. monsoon blows into the gulf. If a ship be able to beat out of the gulf, the same monsoon continues to be adverse, if she is bound to India or Persian Gulf. Admiral Blankett's squadron worked along the coast of Arabia, against the N.E. monsoon, and were two months on

the passage from the Red Sea to Bombay. A fleet of ships of war and store-ships left Johanna 25th Sept., and crossed the equator on the 5th of Oct., in lon. 48° E., which was too far to the W. After getting into lat. $8^{\circ} 20'$ N., about lon. 55° E., they had during five weeks light airs and calms, stood to the N. and made the coast of Arabia, near the islands off Kooria Moorla Bay. The ships of war left the convoy, and proceeded to Bombay against the monsoon; Captain Smith, in the *San Carlos*, left in charge of the store-ships, carried them to Merbat, where they anchored, and procured refreshments and water. From this place the convoy of indifferent sailing-ships worked along the coast against the monsoon to Masterah, and meeting there with a S. wind, steered for Bombay.

Vessels leaving the Red Sea for India or the Persian Gulf during the strength of the N.E. monsoon, should work along the Arabian coast, taking advantage of every shift of wind. Should the current be strong in shore, it is better to stand out 60 or 80 m. from the land; but should the wind be light, advantage should be taken of the tides and land-winds in-shore, anchoring when requisite. The current, which generally sets to the W., will sometimes set to windward for three or four days together, about the F. and C. of the moon. When off Ras-el-Hadd, a vessel may stand across for Bombay; or if, as is possible, a S. wind be met with off the Kooria Moorla Islands or Maseerah Island, a vessel may then stand across for Bombay.

In April, when W. and S.W. breezes commence on the S. coast of Arabia, ships may with safety leave the Red Sea and proceed for the Persian Gulf, or the coasts of India: the favourable season to depart from it is from April to Sept. Ships bound to Surat do not leave Mocha till the early part of Sept., that they may arrive with the latter end of the W. monsoon in Surat Road, about the 20th of that month; for it would be dangerous to run for this anchorage when the monsoon is in full force. When clear of the Straits of Bab-el-Mandeb, from April to Sept., a ship should steer to the E. in the middle of the gulf, where the wind is more steady than in the vicinity of either shore; but if the wind is light or baffling, she must beware of getting near the African coast, on account of calms and strong W. currents, mentioned before.

The best season for leaving the Red Sea for India and the Persian Gulf, is from May to Aug. or Sept., during the S.W. monsoon. Vessels bound to Bombay during those months, should, on leaving the Straits of Bab-el-Mandeb, keep in the centre, or more on the Arabian shore of the Gulf of 'Aden, to avoid the W. current on the African shore; and on reaching the S.W. monsoon outside the gulf, should steer a direct course for Keneri Island, to the S. of Bombay. Vessels bound to Ceylon or the Bay of Bengal during those months should shape a course to pass through the Eight Degrees or Nine Degrees Channel, between the Lakadivh and Maldiva Islands.

Ships bound to the Persian Gulf during those months will find the S.W. monsoon blow strong along the whole extent of coast to Ras-el-Hadd: they should keep at some distance from the shore, as the wind is liable to fall light at night near the coast.

Ships bound to Ceylon, or more to the E., should pass through the Eight Degrees* or Nine Degrees Channel, between the Lakadiva and Maldiva Islands. This route may be followed from March to Nov., and it is preferable to any other during this period, and may be chosen even in the strength of the N.E. monsoon, if a ship keep near Seuheli-par, in passing through the Nine Degrees Channel; but from Oct. to April it is better to pass to the N. of the Lakadives Islands, and afterwards along the Malabar coast to Cape Comorin, and from thence steer for Point-de-Galle.

MONSOONS AND GALES IN GULF OF BENGAL.

The winds on the coast of Coromandel in Jan. prevail from the N.E. during day, in early morning hauling to N. by E., as a sort of land-wind; they begin in Feb. to draw to E. and S.E.: the N.E. monsoon then becoming faint, land and sea-breezes often happen, particularly in the latter part of the month. Early in March gentle breezes, between N.W. and W. blow frequently from the land after midnight until morning, which are generally followed by calms, or faint variable airs, until the S.E. breeze, the *alongshore* wind, comes from the sea about noon. These land and sea-breezes do not always happen in Feb., for E. and N.E. winds then prevail sometimes until March; but they are often interrupted by S. breezes or other changes. About the middle or latter part of Feb., brisk winds between S.E. and S.W. happen at times, at a considerable distance from the coast, by which some ships have made a passage from Tranquebar or Madras to Bengal in seven or eight days. In the middle and E. parts of the bay, the N.E. monsoon prevails in this month, generally with settled weather and a clear sky, and it is considered throughout the bay to be the finest month in the year.

The forerunners of the S.W. monsoon, in the shape of S. winds, commence in March upon the

* A light-house on Minikoy Island was long ago proposed for steamer navigation.

Coromandel coast, for the breezes from the sea in the afternoon draw then well to the S.E., and the land-breezes frequently to S.W. N.E. and E. winds also sometimes happen in this month along the coast, but those between E.S.E. and S.W. usually prevail; the same winds are frequently experienced well out from the land, often light and variable. In the middle, and along the E. side of the bay, light Northerly winds between N.E. and N.W. are mostly experienced during this month, and at times considerable breezes from S.W. and S.; faint airs and calms are liable to happen in March, which is generally a pleasant month, with fair weather in most parts of the bay.

In April, the sea-breezes on the Coromandel coast commence from the S.S.E. about noon, or earlier, and continue until 9 or 10 p.m.; or at times during the night. After midnight the wind frequently veers to S.S.W. and S.W., but seldom blows directly from the land until May, when the land and sea-breezes both become more open and regular. These winds prevailing in April between S.S.E. and S.S.W. or S.W., with a strong current to the N.E., make it almost impossible for ships to work along the coast to the S., particularly if they do not sail fast. About the Nicobar Islands, and near the E. side of the bay, light E. winds are generally experienced all the month of April, often veering to N.E. and N.W., with intervening faint variable breezes and calms. In the middle of the bay, the prevailing winds in this month are variable, mostly from the S. In April, the winds are much from N.W. along the Aracan coast, as on the Bombay coast.

In May, the winds on the Coromandel coast prevail mostly between E.S.E. and S.W.; the breeze generally sets in about noon from seaward, blowing strong from the S.E. until the evening, and sometimes till midnight; afterwards it veers to S. and S.W., where it continues during the morning. Calms or faint airs often intervene between the land and the sea-breezes, at other times the wind veers from the one to the other without abating much of its strength. Sharp squalls from N.W. sometimes blow off the land in May, accompanied at times by showers, with lightning and thunder. The commencement of the May cyclones (which occasionally trouble Madras) is from the N.W. or the N. quarter; so that the careful mariner can conveniently put to sea.

Late in April, or early in May, the S.W. monsoon becomes general about the Nicobar Islands, and in the E. side of the bay, where it is much later than in any other part.

A Cyclone Storm is liable to happen* on the Coromandel coast in April, or even in May, and again in Oct.; but fortunately many years pass over without a storm in either of these months, for they blow with great fury. Storms are generally preceded by a heavy swell rolling in upon the shore, and commence at N.N.W. or N.N.E., veering to N.E. and E., where they blow hardest, with much rain and a high sea, and afterwards abate when the wind veers to S.E. They sometimes do not end in this quarter, but blow with great violence from E., shifting suddenly to S.E. or S., and with great fury ending at S.W.; when this happens, which is seldom, these tempests are severe.

The first of which we have record, occurred on Oct. 3, 1746, when twenty vessels of different nations were wrecked or lost, besides three or four French men-of-war near Madras. Next H.M. ships *Namur*, *Pembroke*, and *Apollo* hospital ship, with the *Lincoln* and *Winchelsea*, E.I.C. ships, were lost at Cuddalore, in April, 1749, during one of these violent storms. A hurricane on Oct. 31st, 1752, was very violent on the Madras coast. Again, on Oct. 21st, 1773, a violent hurricane visited that place, beginning at N.W., and ending with the wind at E.; so it must have travelled S.W., and the vortex passed to S. of Madras. The men-of-war put to sea early, but all the vessels that remained at anchor were lost with their crews. The next cyclone was that of Oct. 20th, 1782, commencing at N.W., which enabled numerous vessels to put to sea, but some men-of-war suffered great damage, and more than one hundred small country vessels were stranded.

On Dec. 10th, 1807, Madras suffered from another hurricane, in which the whole of Black Town was inundated by an extraordinary rise of the sea; fortunately there was only one vessel in the roads, and she put to sea at the commencement of the storm. On the 4th Dec., 1803, H.M.S. *Centurion* experienced a violent hurricane between Trincomalee and Madras. These two, and that (already mentioned) which commenced on Dec. 31st, 1760, are all that we find recorded for Dec., but the most dangerous period of the year is from the commencement of Oct. till mid-Dec.

On the night of the 19th May, 1787, a severe tempest extended along great part of the coast, very destructive to the shipping and to the country. At Coringa the sea rose much above its natural level, and with an overwhelming wave inundated the low country, destroyed the vegetation, many of the villages, thousands of the natives, and numerous herds of cattle. This was considered a singular case, for a tempest seldom happens in May, or even in April, although the latter is reckoned a precarious month on the coast. Almost all the gales on this coast commence at

* The new year of 1761 was ushered in with a most violent hurricane at Pondicherry, where several men-of-war, store-ships and others were wrecked or suffered great damage. Jan. is a late month for such a gale, but several are recorded of Dec.

N.N.W., or from the N.; ships should therefore proceed to sea with these winds when a storm is apprehended, to get an offing before the wind shifts to the E., where it generally blows with the greatest violence from the sea. On the 3rd of May, 1811, a storm did great damage at Madras; and other storms have been experienced in the same month since that time. One happened in May, 1843, but the shipping at Madras rode it out; the brunt of the storm was felt out at sea. The disastrous cyclone of May 1st, 1872, will be fresh in the memory of our seamen. A fine May is reckoned the precursor of a heavy S.W. monsoon; but when a violent gale occurs in May, the monsoon is expected to be rather mild in the Bay of Bengal.

In June, July, and Aug., the S.W. monsoon blows strong throughout the bay, with cloudy weather and much rain at times; the winds veer to W. and N.W., frequently blowing in squalls for several hours together, particularly in the N. part of the bay. On the Coromandel coast, strong land and sea-breezes are frequently experienced in these months; the latter, after noon, generally commences at S.E., veering to the S. in the evening, and continuing from that direction great part of the night. In the morning the wind veers to S.W., and sometimes to W., then becoming a strong breeze from the land. These land and sea-breezes are not always regular; for the land-winds in June and July at times blow strong for one or two days together, veering only to the S. in the afternoon; at other times the S.E. breezes predominate.

The weather is generally favourable on the coast of Coromandel in these months, but it is the stormy season in the N. and E. parts of the bay; for there the S.W. winds blow strong towards the land, with much rain. June is considered a very dangerous month on the coast of Bengal and Aracan, for severe storms are liable to happen in that month about the F. and C of the moon. Many ships, after leaving the river Hoogly in June, and others that have arrived in its vicinity, have foundered with their crews at different times; for few years pass over without a storm happening in that month in the N. part of the bay. These storms are now found (through the important system of registering the winds at different stations), to have a cyclonic character, and not to be simply S.W. monsoon gales. A change of a few points in the wind may induce a vessel to tack or wear, and then she *heads* the heavy sea and pitches violently, carrying away spars and head-gear especially. Such accidents compel many a vessel to put back to the Sand-Heads in June and July.

In Sept., the S.W. monsoon is generally moderate all over the bay, with W.N.W. or N.W. winds at times. The prevailing winds in this month, on the Coromandel coast, are S., the sea-breezes from S.E., and those from the land are very variable between S.W. and N.W. Although the winds are generally moderate in this month, with settled weather, yet towards the latter end of the month, gales have sometimes happened near the entrance of the river Hoogly, in which several ships have been dismasted.

The N.E. Monsoon, on the Coromandel coast, generally commences in Oct., mostly between the middle of that month and the 1st of Nov. Although Oct. is considered a very dangerous month on that coast, the winds continue often light and variable with fine weather until near the end of the month; but more frequently about the middle of the month the weather becomes gloomy and threatening prior to the setting in of the N.E. monsoon, which is liable to commence with a severe storm, usually beginning at N.N.W., or from the N., and veers afterwards to N.E. and E. At Coringa, it sometimes begins at N.E., which indicates that the centre of the revolving storm bears S.E. from that place. In the S.E. parts of the bay, at times, they begin from S.W. or W., showing that the centre is to the N.W. and the N.

These storms are liable to happen between the 10th Oct. and the 10th Dec., a period in which the shipping at anchor on the Coromandel coast have sometimes suffered greatly, for the wind blows with great violence towards the shore from the E. in these storms; and on the coast of Aracan, equally strong upon the land from the W. In some years a storm has been experienced so late as Jan., but these are generally partial, confined to the vicinity of the S. part of the Coromandel coast and the N.E. part of Ceylon. (See foot-note at page 318, *also* Gales at page 300).

In the N. part of the bay, the N.E. monsoon begins early in Oct. in some years; in others, not until the end of that month, or early in Nov.; but in the central and S. parts of it, between the Coromandel coast and the Nicobar Islands, and thence towards Ceylon, W. winds frequently prevail more than any other, in both these months. These winds are sometimes light and variable, between N.W. and S.W.: when they become brisk, and veer to S.W. or S.S.W., they often reach far to the N. into the bay. The *Warren Hastings* had S. winds from lat. 16° N. until she anchored in 9½ fathoms, in sight of the Calcutta Floating Light-vessel, 16th Oct., 1822; but not seeing any pilot vessels, and a gale commencing, with a fall of the barometer from 29.37 to 28.96 on the 18th, she cut her cable, and stood out to sea. Her main-sail, main-topsail, main-trysail, and main-royal pole were blown away, one boat washed off the quarter, the other quarter-boat stove and blown inboard, with other damage; her cutwater started from its place about 3 inches in the gale.

To the N. of lat. 17° or 18° N., the winds are often very light in the N.E. monsoon, sometimes inclining at N.E., but more frequently between N.N.E., and N. by W. Calms and faint airs prevail much in the N. part of the bay, particularly in soundings along the head of it, and along the coast of Aracan, during the whole period of the N.E. monsoon in the open sea.

In Nov. and Dec., on the Coromandel coast, the wind blows mostly from N.N.E., sometimes accompanied with showers of rain; in the morning it veers at times N.N.W., inclining a little from the land, and in the afternoon a little from seaward; but it frequently blows steadily along shore for several days together, without any variation, with a considerable swell and a great surf rolling upon the shore.

From the middle or latter part of Nov. until March, the prevailing winds out in the open sea are between N.N.E. and E.N.E. throughout the Bay accompanied with clear settled weather; but short intervals of variable winds, from S.E., S., or S.W., are sometimes experienced in these months, when the N.E. monsoon predominates. On the E. shores of the bay there are land and sea-breezes in this season, although the coast of Aracan is subject to frequent calms, or faint airs, and N.W. winds. Between the Andaman Islands and Junkseylon, S. winds and cloudy weather, with rain, are at times experienced in Dec. and Jan.

In Jan. the weather is usually favourable, with steady N.E. winds in most parts of the bay: on the Coromandel coast they draw to E.N.E. in this month, during the day, and blow along shore from the N., or incline a little from the land in the mornings; but sometime, in Jan. and Dec., the N.E. winds continue for three or four days together, without much variation in direction or force. In Feb. the N.E. monsoon ends on the Coromandel coast; the weather is then favourable, and Southerly winds commence about the latter part of this month, or early in March.

Along the head of the bay, in the vicinity of the sands and rivers, from Dec. to March, or until the S. winds set in strong, there are frequent light airs and calms, with a very smooth sea. These calms, or faint airs, are liable to happen day or night, but the breeze generally fails with the setting sun, and a calm continues in the first part of the night. About midnight, a gentle breeze often commences at S.E. or S., veering gradually to W. and N.W. in the morning, and continuing this circular course, increases in strength from the N. about 8 or 9 a.m. with the rising sun.

The S.W. Monsoon is preceded by S. and S.W. winds, which generally commence about the entrance of Hoogly River, off Point Palmiras, and along the N. part of the coast of Orisa, about the latter part of Feb., or early in March; but not so early on the N.E. side of the bay. Towards the end of March, or early in April, the S. or S.W. winds begin to set in regular and strong, with cloudy weather, and sometimes rain; but the stormy weather of the S.W. monsoon, with hard squalls and much rain, is seldom experienced until about the middle or latter part of May, and it continues until Sept. (*See top of page 319.*)

June and July have the worst weather, for towards the middle of Aug. it is sometimes fair for several days together, although hard gales have also been experienced in this month in some seasons. In Sept., the S.W. monsoon being on the decline, the weather is usually moderate and cloudy, with little rain; towards the latter part of this month, or early in Oct., the S. winds fail, and are followed by variable breezes; and sometimes a storm is experienced all over the bay in Sept. or Oct., previous to the setting in of the N.E. monsoon.

PASSAGE TO BENGAL FROM THE S. PARTS OF THE GULF.

To sail from the Coromandel coast or other S. parts of the bay toward Bengal, the most favourable time to make a speedy passage is from the end of Feb. or 1st of March to mid-Sept. when the S.W. monsoon predominates. Ships bound from the Malabar coast, or S. part of Ceylon, to Bengal, late in Feb. or in March, should work along the E. side of that island to Aganis or the Friar's Hood, if the winds are moderate and the current not unfavourable; then proceed on a direct course, as the winds admit, for the coast of Orisa about the high land of Pondy. After reaching the S.E. part of Ceylon, about the Basses, if strong N.E. winds and S. currents be experienced, rendering any progress to the N. difficult, it may be prudent to prevent loss of time, to stand off to the E. close to the wind; and when 1° or 2° from the land, it *probably* will become variable at N.W., W., or S.W., or sometimes at S.E., favourable for proceeding to the N.; but it is advisable not to stand far to the E. into the middle of the bay, where the winds are generally from the N. in March, with a current often setting to the S.

Departing from Madras towards Bengal, late in Feb. or in March, it is prudent to keep at a considerable distance from the land, to benefit by variable winds, which may be sometimes expected from the S.: whereas, near the coast, E. or N.E. sea-breezes and faint airs are frequently experienced, making it tedious to get to the N. When an offing is obtained, according

as the wind will permit, a course should be followed to make the coast of Orixa about Pondy or Ganjam, where the land is high and bold; if a ship do not make it here, she ought certainly to endeavour to get a sight of the Jaggernaut, or Black Pagodas.

Ships leaving Achen Head or Malacca Strait at the period last mentioned should proceed on either side of the Nicobar Islands into the bay, as may be most convenient with the prevailing winds, then steer for the coast of Orixa as directed.

S.W. Monsoon. From the beginning of April to mid-Sept. the S.W. monsoon generally prevails along the W. side of the bay; during this period, ships bound to Bengal from Ceylon or the Coromandel coast, ought to keep within a moderate distance of the land, as the wind sometimes inclines from the W. They should also observe, not to approach it very close until to the N. of Vizagapatam, by which will be avoided the curvatures and large bays, and the S.E. sea-breezes that blow into them frequently with considerable strength. As the currents are liable to run strong to the N.E. when the S.W. wind is strong, it will be proper, when observations are not obtained, and the distance of the land not exactly known, to haul in for the coast, and make it in lat. $18\frac{1}{2}^{\circ}$ or 19° N., then follow directions for the River Hoogly during S.W. monsoon.

Ships bound to Bengal, from Achen or Malacca Strait, in the S.W. monsoon, might come out by the Surat Passage, or rather between Pulo Brasse and Pulo Rondo, whereby they will be enabled to pass to the S. of the Nicobar Islands, or they may keep close along the E. side of these, and pass between them and the little Andaman; or should a ship steer to the E. of all the islands, and proceed through the Cocos Channel to the N. of the Great Andaman, she will *generally* be able to make the coast of Orixa about Point Palmiras, without tacking, unless the winds hang to S.W. and W.S.W., with a N.E. current, which sometimes happens in the strength of the monsoon; and this makes the passage to the W. of the islands preferable, when that route can be followed.

Ships leaving Ceylon, or the Coromandel coast for Bengal, late in Sept., should stand well out from the land: if the S.W. winds are found steady, a direct course may be steered for Point Palmiras. If the monsoon appear to be expended, and the winds incline from the N. or N.E., every advantage ought to be taken to get over on the E. side of the bay, by attending to the shifts of wind; and when within one or two degrees of the Andaman Islands or Cape Negrais, it will be prudent to make all the Northing possible with the N.E. winds, and endeavour to fall in with the entrance of Saugor Channel. Departing from Madras or other S. ports on the Coromandel coast, in the early part of the N.E. monsoon, ships are liable, when the winds are light at times from E., to be drifted along that coast and the E. side of Ceylon by strong Southerly currents, before an offing can be obtained; here they frequently meet with N.W. winds, favourable for running over in the E. part of the bay.

N.E. Monsoon. In proceeding to the N., it is advisable to work in the open sea, and not along the coast of Aracan, although in Oct. and Nov. that coast may be approached within any discretionary distance, being the windward shore; for in the *early* part of the N.E. monsoon the coast of Orixa should be avoided, because *then* the current generally runs strong to the S.W. along that coast. This current to W.S.W. off the Bengal sand-heads is probably increased much by the enormous discharge of monsoon rains down the Ganges and Brahmaputra Rivers.

About the end of Dec. the Southerly current begins to abate on the coast of Orixa, after which many ships approaching the entrance of Hoogly River fall in with the coast about Point Palmiras or the False Point, and from thence soon reach the entrance of Saugor Channel, by standing out to sea into deep water, and afterwards to N.; but it is prudent, during the whole of the N.E. monsoon, to work up in the middle of the bay, or nearest to the E. side, and endeavour by a direct route, when confident of the longitude, to strike soundings on the tail of Saugor Sand, or the Eastern Sea Reef, without approaching the coast of Orixa, or too near that of Aracan; agreeably to the directions given for approaching the river Hoogly in the N.E. monsoon.

During the whole of this monsoon, ships bound from Achen or Malacca Strait, to Bengal, have the choice of proceeding by any route circumstances require: they may pass outside the Nicobar Islands, or through any of the channels between them and the Little Andaman, or that formed between the latter Island and Great Andaman; but it seems preferable for ships coming out of Malacca Strait, after taking a departure from the S. end of Junkseyon, to steer for Narcondam Island and pass through the channel betwixt the N. end of the Great Andaman and Coco Islands, or between the latter and Preparis Island. Having passed through either of these, they should steer to the N. close hauled for the entrance of Saugor Channel, making a direct course if the winds admit, or by tacking occasionally, without borrowing too near the coast of Aracan.

FROM BENGAL TO MADRAS, CEYLON, AND BOMBAY.

To sail from Bengal to Madras and the S. parts of the bay, the best time to make a good passage is from mid-Oct. to mid-Feb., when the N.E. monsoon predominates.

Ships leaving Bengal in Sept., bound to Madras, or any other part of the Coromandel coast, ought to keep near the W. shore; the prevailing winds in this month will be found from S.S.W. to W., often light and baffling, with a drain of current to the N. at times. If after leaving the pilot, the wind keep well to the S., a ship ought to stand for the W. shore, and work along it to the S.W., keeping mostly in soundings, so long as her progress is considerable. Should that be very slow, it may be expedient to stand well out from the land, and take every advantage of the shifts of wind; for at times when the current sets to the N.E. along the coast, there is none experienced in the offing; at other times the current runs to the N.E. in this month, in the open sea, when there is none running on the coast of Orisa; so that the most speedy passage may at one time, in Sept., be experienced, by keeping along the coast, and at another time, by keeping well out from the land, in the same month. It would, however, be very imprudent for a ship bound to any part of the Coromandel coast in this month, to stand out into the middle of the bay, as the wind prevails at times from the W.

In Oct. and Nov., ships should keep within a moderate distance of the coast, prepared for bad weather which is then liable to happen; after mid-Oct., they may experience N.E. winds for several days after leaving the pilot, but will *probably* meet with them variable when well to the S., sometimes from S.W. in the offing, but close to the coast, generally from the E. To whatever part of the Coromandel coast a ship is bound, after the middle of Oct., she must get in with the land to the N. of that place, to prevent being carried past her port of destination by the strong currents, which prevail part of Oct., Nov., and Dec. If bound to Madras, it will be prudent to make Pulicat Light, and take care not to pass that place until in soundings.

When bound to Trincomalee, or any place on the E. side of Ceylon, in the same season, a ship must likewise endeavour to make the land to the N. of her port, or she will probably be carried round on the S. side of that island, by strong S. currents; but the entrance of Palk bay, between Point Calimere and the N. end of Ceylon, ought not to be approached close, as the current sometimes runs through it to the W., and with $\frac{1}{2}$ N.E. gale it becomes a *dangerous* lee shore, the more so because the banks have never been thoroughly examined and laid down on the charts.

In Dec., the same route as in the preceding month is proper; a moderate distance from the coast should be preserved, where the wind will usually be found more steady than close in with the shore. In this month also the current generally runs strong along the coast to the S., rendering it necessary to make the land to the N. of the intended port. If the weather is clear, a ship bound to Madras may haul in for Armogham Hill in the day, which will be seen when 2 or 3 leagues outside the shoal, but not if the weather is hazy; in the night, it should not be approached, being steep-to, having 28 or 30 fathoms within 3 or 4 m. of its outer edge.

A ship making the land about Pulicat, or a little to the N. of Madras, has now the advantage of the Red Pulicat Light. Between Nov. and Jan., when strong S. currents may be expected, she ought to haul into 16 or 17 fathoms, but not to come under these depths if it is night, till past Pulicat Reef: she may then borrow into 11 or 12 fathoms. The Madras bright *flashing* light will soon be seen, to guide her into the road, if the weather be clear; otherwise she ought to anchor to the N., or work to windward during the night, to prevent being driven to leeward. Ships having a cargo to discharge at any of the ports on the coast during the N.E. monsoon, ought to anchor a little to the N. of the landing-place, or with it bearing about W., that the loaded boats may be enabled speedily to reach the shore. To avoid Pulicat Shoals, the Madras Light (seen from aloft) should not be brought to the S. of S.S.W. $\frac{1}{4}$ W.

Ships passing from Bengal to the coast, in Jan., should keep at a moderate distance from the land, out of the influence of light or variable winds, and when nearly in the latitude of the port to which they are bound, ought to steer for it. If the wind is found to blow strong from N.E., it will be prudent to haul in for the land a little to the N. of the port; but if the month is far advanced, and the winds be light or variable, they should, after reaching its parallel, steer for it direct.

In Feb., ships leaving the pilot at the Sand-heads, ought to keep well out from the coast of Orisa, by steering to the S.; the light winds and the land and sea-breezes near the shore will then be avoided, for in the middle and E. parts of the bay in this month gentle N.E. winds usually prevail. After the beginning of this month, when they approach the Coromandel coast, S.W. breezes and a current running along it to the N. *will probably* be experienced, making it advisable to keep well out in the open sea, until they are able to make the land a little to the S. of the port to which they

are bound : or if the wind continue steady from the N. or N.E. as they draw near it, a course should be steered for it, bearing about W. ; but they should not make the land of the Coromandel coast to the N. of their port after the 1st of Feb.

During the whole of the N.E. monsoon, from Sept. to March, ships bound to the E. coast of Ceylon ought to fall in with it to the N. of their port. If bound to the opposite side of that island, or to the Malabar coast, they should endeavour to make the land about Aganis, or to the N. of the Basses ; then sight in succession the White *flashing* light of Little Basses and the Red *revolving* light at Great Basses, and then coast round the S. and S.W. sides of the island.

In March and April, ships departing from Bengal to the Coromandel coast or Ceylon will probably have the winds at first variable between S.S.W. and W., with which they ought to steer to the S. ; if the wind be fair, a S. course is the best, or S.S.E., as the winds admit ; they will be found in March light and variable in the middle of the bay, mostly between W. and N.E., but near the W. side, mostly from S.W. To benefit by N. winds, ships ought to keep to the E. of the meridian of Point Palmiras, until they are well down the bay, taking care not to approach the Great Andaman Island, particularly if it is late in April ; for then a gale from the W. is liable to happen, which would make it a dangerous lee shore. After having taken advantage of shifts of wind by tacking when necessary, it will be prudent that they proceed about 20 leagues or more to the S. of the intended port before they haul across the bay towards it, making due allowance for a strong current running to the N., with S. winds, which will be experienced as they draw near land.

If it is late in March or early in April when ships leave Bengal River, light S.W. and S.S.W. winds may be expected to predominate throughout the middle and W. parts of the bay ; but to the E. of the Andaman Islands, they are generally from N.W. at the same time ; on this account some ships bound to Europe, or by the Southern passage to Bombay, proceed to the E. of these islands, and on either side the Nicobar Islands, as seems most eligible ; but when the winds permit, the route to the W. of all the islands is preferable, taking care to avoid the bank with 4½ fathoms on it, about 9 or 10 leagues to the W. of the Great Andaman. Ships ought, on that account, to work or pass down the bay well to the W. of these islands, particularly late in April.

Ships bound to the E. coast of Ceylon in March and April, ought to keep well to the E. in passing down the bay, agreeably to the directions given for proceeding to the Coromandel coast ; having reached lat. 10° N., and nearly on the meridian of Point Palmiras, or that of the sea-reefs, a course should be steered for the land to the S. of their port, as the currents set strong to the N. at times along the N.E. side of Ceylon in these months, as they do also along the Madras shore. But to the S. of the Basses, the current runs to the W. till May along the S. side of Ceylon. If bound to the W. side of that island, or to the Malabar coast, they should, from lat. 9° or 10° N., steer for the S. part of Ceylon, and endeavour not to fall in with it to the N. of the Great Basses.

Ships bound to the Malabar coast in these months, ought not to keep near the island after reaching Point-de-Galle, for brisk S.W. winds often blowing into the Gulf of Manar, make it then advisable to stretch out from the land and get well to the W., that they may be enabled to round Cape Comorin without loss of time.

During the N.E. monsoon, from Sept. to May, ships bound from Bengal to Achen or Malacca Strait, should steer to the S.E., and pass between Cape Negrais and Preparis Island, or betwixt the latter and Coco Islands : from thence a direct course may be adopted to Pulo Way, if bound to Achen ; or to Pulo Bouton, if bound through Malacca Strait, or to Prince of Wales Island. The currents on the E. side of the bay and about the Andaman Islands in March, generally set to S.W. and S., making it advisable to keep well to the E., if it be intended to pass through any of the channels to the N. of these islands. If a ship fall to leeward, she ought to steer to the W. of the Great Andaman, and pass between it and the Little Andaman, if the wind and currents admit ; otherwise, she must work to the E., betwixt the latter and the Island Carnicobar, which will considerably protract her passage. It is therefore prudent to keep well to the E. after leaving the pilot, and proceed to the N. of the Island Preparis. The currents between these islands and Junkseylon are very variable in the N.E. monsoon ; in the early part of it they mostly set to the N.W., but at the close, in March and April, generally to the S.W. and S.

In the S.W. monsoon ships leaving Bengal, whether bound to the Coromandel coast, to Ceylon, to any place W. of Malacca Strait, or by the Southern passage to Bombay or the Persian Gulf, were formerly told to keep well to the W. in passing down the bay, and avoid the Andaman Islands, where the squalls are often sudden and severe, with dark cloudy weather, rendering it almost impossible to get to the S., when ships fall in with them in this season. The *King George*, bound from Bengal to Bombay by the Southern passage, left the pilot 29th May, 1791, and made the Sentinel and W. side of the Andamans, 7th June, having experienced about 1° of E. current from leaving False Point. Severe squalls and very unsettled weather close to these islands made it

impossible to weather them; carried away the fore-yard 10th June, was forced to run to the N. round the N. end of the Great Andaman, and proceeded to Prince of Wales Island to replace the fore-yard. Here was found another ship bound to Bombay, that left the pilot before us, getting repairs, having disabled a lower mast and sustained other damage, on the W. side of the Andaman Islands.

Ships departing from the River Hoogly from April to Sept., to prevent getting over to the E., after quitting the pilot, ought soon to tack, when the wind will admit the W. shore to be approached about the False Point. They will find the winds veer frequently towards the land in the night, favourable for standing to the S.; and in the day generally blowing along shore, or inclining a little from the sea. With these winds, they ought to work to the S. along the coast, endeavouring to be well in with the shore when the land-breezes may be expected, between midnight and 2 or 3 o'clock in the morning. In June and July these land-winds often prevail, when a passage may at times be made from leaving the pilot to Madras in ten or twelve days; at other times they do not happen, when the along-shore winds are prevailing; but as this is the windward coast, where the sea is more smooth and the weather more favourable than in the middle and E. side of the bay,* ships *should resolve* to keep near it, so long as they make considerable progress to the S. If on the coast of Orixá the current is found to run to the N., without any favourable breezes from the land, rendering it difficult to gain much ground, a stretch to the S.E. may be made about 23 or 25 leagues from the land, where *probably* there will be less contrary current than in soundings; but it would be imprudent to stand far over into the bay in search of better winds.

By keeping near the coast, or within a moderate distance, making a stretch close in at times when the land-breezes are expected in the night, these favourable breezes will become more certain as the distance is increased to the S.; having got as far as Point Gordeware, it will not be necessary to approach the shores of the deep bays situated between that point and Pulicat, but a stretch may be made from the point to S. until past them, then work in towards the coast about Armegon, or between it and Pulicat. The land-breezes will now become more regular, with sea-breezes from S.E. in the day, enabling ships to proceed along the coast with facility.

Ships bound to Trincomalee must continue to work along the coast of Coromandel to Negapatam, before they stretch across the entrance of Palk Bay for the island of Ceylon. From Point Pedro Shoals to Trincomalee, they will generally find a S. current in the S.W. monsoon.

Ships departing from Bengal, bound to Achen or Malacca Strait in the S.W. monsoon, ought to proceed nearly by the same route as in the opposite season. After leaving the pilot, they should stand to the S.S.E. as the winds admit, until to the S. of lat. 15° N.; if then certain of their situation, a direct course may be steered for the light at the N. end of the Coco Islands, or for Landfall Island off the N. end of the Great Andaman. If not confident of their situation, it will be prudent to get into lat. 14° N., previous to edging away for the channel betwixt Landfall Island and the Cocos, which ought to be chosen, because it is farther to windward than that between the latter islands and Prepara; and the winds frequently inclining to S.W. or S.S.W. in the early part of the S.W. monsoon, render it advisable not to fall to leeward.

Having passed the Coco Islands, or between them and Landfall Island, they should keep nearly close to the wind, in proceeding to the S., to avoid the archipelago of islands off the coast of Tanasserim, which should not be approached in the S.W. monsoon. Neither should the E. side of the Andaman Islands be borrowed on too close, in case of getting near the Invisible Bank, which is very dangerous to approach in thick weather, or in the night. To prevent either of these extremes, a course may be steered from the Coco Islands direct for Barren Island; and from the latter, after passing it on either side as most convenient, ships may keep nearly close to the wind if bound to Achen, giving the Invisible Bank and Nicobar Islands a proper berth. If bound to Prince of Wales Island or Malacca Strait, it will not be requisite to keep so close to the wind; nevertheless, it is prudent to steer well to the S., to give a sufficient berth to the Seyer Islands and S.W. end of Junkseylon in passing, in case S.W. winds should prevail off that headland, which is not always the case in the S.W. monsoon. When round Junkseylon, a direct course ought to be steered for Pulo Bouton, and from thence to Prince of Wales Island (Pulo Penang).

The directions given in the preceding page will answer equally for ships proceeding from Bengal to the Coromandel coast, or to the W. parts of India, during their passage down the bay. In the former case it is indispensable that ships bound to the coast, or to Ceylon, do keep near the land on the W. side of the bay, during the strength of the S.W. monsoon. The same route is advisable for ships proceeding to the W. parts of India, or to Europe, although it is not so particularly requisite that these continue to keep close to the land.

* Many ships, deeply laden with rice, after leaving the River Hoogly in June, and some in July and Aug. have encountered storms, with a heavy turbulent sea, and foundered with their crews in the N.E. part of the bay.

If, after leaving the pilot, the wind keep well to the W., a long stretch down the bay may be made. When it veered to S.W. and S.S.W. they used formerly to tack, and stand in for the W. shore, taking particular care not to get over to the E. near the Andamans. If they get fast to the S. by keeping near the coast, it will be prudent to continue to do so; if on the contrary the progress is slow, they ought to determine to pass to the E. of the Andaman Islands; the excellent fixed light on Table Island to N.N.E. of the Great Coco, with more correct charts of the Bay of Bengal than they had in Captain Horsburgh's day, render the navigation easy, and the wear and tear of a vessel, hammering against the monsoon down the middle of the bay, is avoided.

When with the prevailing winds they can pass 30 or 40 leagues to the W. of the Little Andaman, they ought to continue to stand to the S.; for in such cases they will, *probably*, be also able to pass to the W. of the Nicobar Islands and Acheen Head without tacking. Ships coming down the bay far to the E., will usually find it tedious getting to the S., in the space between lat. 3° or 4° N. and the S.E. trade-wind; which is occasioned by light variable winds and squalls, mostly from S. and S.W., in the vicinity of the islands near the W. coast of Sumatra; whereas ships that stretch to the S., from the E. part of Ceylon, experience few light winds in passing from the S.W. monsoon to the S.E. trade.

Ships from Malacca Strait, bound to Europe, or to Bombay by the Southern passage in the S.W. monsoon, ought to keep along the N. coast of Sumatra from Diamond Point to Acheen, where the current will soon carry them to the W., although calms and faint airs may be experienced. From Acheen they should either proceed out by the Surat Passage if the weather be very favourable, or should work close round the N. end of Pulo Brasse, where the current frequently runs to the W. among these islands, when at the same time it is running strong to the N.E. betwixt Pulo Rondo and the Nicobar Islands. Ships, therefore, ought not to attempt to work out in the Great Channel, but should proceed through the Bengal Passage, betwixt Pulo Way and Pulo Brasse. Having got fairly out to the W. of Acheen Head, every advantage must be taken to get to the S. into the S.E. trade, and to keep well out from the islands adjacent to the W. coast of Sumatra, by tacking with every favourable change of wind.

Ships leaving Madras in the S.W. monsoon, bound to Europe, or to the W. parts of India by the Southern passage, may, when the land and sea-breezes are prevailing, coast along to Pondicherry before they leave the land; but in the early part of the monsoon, when the winds blow mostly along-shore, with a strong current running to the N. in soundings near the coast, it is tedious and difficult to work along it to the S. At such times, to prevent delay, it seems advisable to stretch off from Madras close-hauled, with the along-shore winds, for they will generally be found to veer more to the W. in the offing, particularly as the distance to the S. is increased. With these winds ships ought to stand to the S.S.E., and as the equator is approached, the S.W. monsoon will decline, and the winds will draw more to the S.; it will then be proper to stand close-hauled to the S.E., or on the tack on which most Southing can be made.

After getting the S.E. trade, ships bound to Europe generally steer a direct course to pass well to the S. of the Island Roderigue, and the S. end of Madagascar; but those destined for the Red Sea, the Persian Gulf, or Bombay, have the choice of proceeding by two different routes to the W.; for which brief directions have been given in Passages to and from the Red Sea (page 315), and some farther instructions in this place probably will be of utility.

It may be observed as a *general rule*, that the farther the Island of Sumatra is distant, the nearer the S.E. trade-winds approach the equator; and in June, July, and Aug., when they blow nearest to it, they may be expected in from lat. 2° to 4° S.

The short S. passage should only be adopted late in June, all July, and early Aug., when the N. limit of the S.E. trade approaches nearest the equator. If a ship during this period cross it well to the W., and having got into lat. $4\frac{1}{2}^{\circ}$ S. find a steady S.E. trade-wind, she may run down her Westing near that parallel, keeping between it and lat. 5° S. When she gets into lon. $73\frac{1}{2}^{\circ}$ or 74° E., it will be proper to avoid the N. end of Speaker's Bank, by not exceeding lat. $4^{\circ} 30'$ S. whilst passing it; and she ought to keep nearly in the same latitude afterwards, until sufficient Westing is obtained. (See also Steamer Track, page 327).

The long S. passage is more certain at all times than the last; and it is only because *there*, in June, July, and Aug. the weather is often cloudy with rain, depriving the navigator of regular observations, that some prefer the N. route in these months.

When ships cross the equator far to the E., or depart from Sumatra or Java, the S. route ought to be followed: and should be adopted always in May, part of June, Aug., and the early part of Sept., by ships making the Southern passage to Bombay, or other places to the W. A ship proceeding by this route should get into lat. 9° to 10° S. as speedily as possible, where a steady and strong S.E. trade is generally found with which to run down the Westing. If not certain of her

longitude by observation or chronometer, it will be advisable to steer for the Island Diego Garcia to correct the reckoning, and where water may be obtained if wanted; otherwise, she ought to continue in lat. 8° or 9° S. until 40 or 45 leagues to the W. of that island. If Diego Garcia is seen, it may be advisable to make a course from its S. end, either W. $\frac{1}{2}$ S. or W. by S., to give a berth to the Centurion Bank and to Owen Bank, the former bearing from it W. 7° S., distant 33 leagues, having never been explored, but is *probably* not dangerous. Owen Bank lies to the N.W. of Centurion Bank, and they are described under another Section.

To whatever place a ship is bound, sufficient Westing should be made to the S. of the equator, to enable her to make a fair wind of the S.W. monsoon, which frequently hangs far to the W. and blows strong, producing a current to the E. Several ships, when formerly navigated by dead reckoning, fell in with the Maldiva or Laccadiva Islands, and were obliged to stand back into S. lat. to run down more Westing. The *St. George*, bound from Bengal to Bombay by the Southern passage, got into the Gulf of Manaar in June, 1791, when they reckoned themselves 7° or 8° to the W. of Cape Comorin, by which they lost their passage.

Being between 2° and 3° to the W. of Diego Garcia, or in lon. 70° E., a ship may begin to steer a little to the N. of W. If bound to the Red Sea, she ought to pass near the most N. of the Seychelle Islands, or make the Island Denis, to correct the longitude if the weather admit, and from thence steer a course to cross the equator in about lon. 49° or 50° E. By crossing it well to the W., she will find the S.W. monsoon favourable in proceeding for Cape Guardafui, and particular care is requisite to fall in with the coast of Africa to the S. of that headland; should she be carried past it by the current, the difficulty of getting in with the land in opposition to a strong S. monsoon and lee current would be found *probably* insurmountable in an indifferent sailing-ship.

From Ras Guardafui, she must work along the coast of Africa to Burnt Island, or farther, against W. winds prevailing in this season, before she stretch over for the land of Cape Aden, if the wind admit.

A ship bound to the Gulf of Persia ought to cross the equator in about lon. 54° or 55° E., and follow the directions given for sailing to that gulf in a former part of this chapter.

Having made $2\frac{1}{2}^{\circ}$ or 3° Westing from Diego Garcia, a ship bound to Bombay should steer to the N.W., and cross the equator in about lon. 64° or 65° E.; to the E. of which it would be imprudent to cross the equator in the strength of the S.W. monsoon, more particularly in a ship that sails indifferently with a strong wind and a high sea upon her beam, which are liable to prevail from W.S.W. and W. during this season, between the equator and the coasts of Arabia and Hindoostan.

In steering to the N., a ship ought to keep far to the W. of the Laccadiva Islands, and not approach the coast until she get into the latitude of Kundaree Island, at the entrance of Bombay Harbour, at least 20 leagues to the W. of that place: she may then follow the directions given for approaching Bombay Harbour in the S.W. monsoon.

Ships leaving Bengal in the N.E. monsoon, bound to the Strait of Malacca, should, at leaving the pilot, keep their wind, to weather the island of Preparis, or pass close to the W. of it, when they will have a fair wind all the way down. They will experience a current to the W., crossing from the Sand-heads to Cape Negrais, of perhaps 90 to 100 m. Ships should haul close round Junkseylon and the Brothers, and if they can go within Pulo Bouton they ought to do so, as there is a strong off-set or current to the W. all along the bay.

Ships leaving Bengal, bound for the Strait in the S.W. monsoon, should, on leaving the pilot, keep the wind free, and pass to the E. of the Cocos Light; but be careful of coming near the Preparis in this monsoon, as there is a shoal lies out to the W.S.W. of the S. end of the island 3 or 4 leagues. After passing these islands, they should keep the wind a little free, and steer for the Seyer Islands, then pass to the E. or W. of Pulo Bouton as may seem proper.

Departing from Madras for Malacca Strait in the S.W. monsoon, I would advise making a fair wind, and steer to go through the Ten Degrees' Channel, in place of sailing close by the wind for Achen.

Leaving Madras for the Strait in the early part of the N.E. monsoon, it *may be* best to fetch where you can to the S. of Achen Head, then work through the Surat, or Bengal Passage, and afterwards along shore to Diamond Point, from whence you can cross over to Penang. In the latter part of the monsoon, or after the 15th Feb., when the S. winds have set in, it may be best after leaving Madras, to proceed along shore a considerable way to the N., then stand off, to pass through one of the channels between the Great Andaman and Cape Negrais, or between the Great and Little Andaman.

The *James Sibbald* in 1826 remained in Madras Road from Nov. 25th till Dec. 21st, preparing for the reception of troops, and had often unsettled rainy weather. She sailed on the 21st Dec.

for Penang with troops, had the N.E. monsoon usually between N.E. and E. by N., with which she beat across the bay, and never went to the S. of lat. $7^{\circ} 40'$ N., nor to the N. of lat. $13^{\circ} 18'$ N. Jan. 7th, 1827, she saw the Great Centinel, passed near to the Little Centinel, then through the channel to the S. of the Little Andaman on the 8th, passed Barren Island on the 12th, and observed the volcano on the island to be in an igneous state. Passed Junkseylon on the 19th, and on the 25th arrived at Penang.

Ships leaving the Strait of Malacca for Bengal in the N.E. monsoon should go to the E. of the Andamans, if the wind be favourable: but they ought not to lose any time tacking about, as the farther they are off the E. or W. shore, the more the wind will draw to the E.; so, rather than lose time, they should pass through the Ten-Degrees Channel, and after reaching lat. 18° to 19° N., if not far enough to the E., they can make a stretch that way for a day or more if necessary.

Ships leaving the Strait, and bound to Bengal or Madras in the S.W. monsoon, or if bound across the equator, should keep close along the Pedir coast, where a current to the W. will always be found in their favour, and a land-wind at night. They should go through Acheen Road, and if blowing weather prevail, anchor for a few days until it moderate, then push through the Bengal Passage, and they will weather the Nicobar Islands with ease; from hence, ships bound to Calcutta will have a fair wind. If bound to Madras, they may probably, if the wind hang far to the W., be obliged to tack now and then to get to the S.W., but on no account cross the equator, to get Westing; sooner make the Coromandel coast, and beat down along shore. Ships bound across the equator to Europe, or other W. ports, on leaving the Bengal or Surat Passage, ought to carry a press of sail to get Westing.

In the S.W. monsoon, a fast-sailing ship bound to Calcutta may always with safety go *also* up within the Andaman Islands, and pass the Coco Islands either to the E. or W.; but it is preferable to pass to the W., being in such case more to windward, and from hence, she will with ease fetch Point Palmiras, or even the False Point, if required.

STEAMER TRACK FROM BAY OF BENGAL TO ADEN.

The rapid development, during the last three years, of the new Ocean Highway between Europe and the East, by way of the Mediterranean and Red Seas, seems to have taken the British Government by surprise, and no adequate provision has been made to benefit the vast commercial steam-traffic by establishing coal depôts and light-houses at convenient positions along the tracks which steamers take at the two seasons of N.E. and S.W. monsoons. Many have been the losses and break-downs already, and it is to be hoped that intelligent and public-spirited commanders of steamers will point out (what they discover to be) the hindrances to safe and rapid navigation in the Indian Ocean.

During S.W. Monsoon. Captain John Steele of the *Erl King* has been one of the first to publish some intelligent remarks as to the best homeward route across the Indian Ocean during the always heavy S.W. monsoon. He says, "Vessels from Ceylon, or from any port in India to N.E. of Ceylon, should shape a course for the Southern Maldives—say, to pass through the One-and-a-half Degree Channel—and, gaining a little Southing on this position (steering about W. by S., or a little more to the S.), they should hold the belt of moderate winds which they will meet near the equator, until they reach the meridian of lon. 58° E. Then they should edge away to the N.W. under both steam and sail, having strict guard of the current upon their course. This current will set about N.E., about $1\frac{1}{2}$ knots per hour near the equator, increasing as you proceed N.-ward to $3\frac{1}{2}$ knots per hour as you approach Ras Hafoon. After passing this headland or promontory (which you should sight if possible), the current will set more to N. The land to N. of Ras Hafoon is high and bold, but the haze is very deceptive, and you may be very close to the land without seeing it. By daylight, the change in colour of the water, from blue to pale but dull green, will warn you of its vicinity. A cast of soundings on this bank will show your distance from the land. After passing Cape Guardafui, you will meet fine clear weather, probably to become hazy again, and slightly disturbed as you advance up the Gulf of Aden."

Leaving Malacca Strait during S.W. Monsoon. "Vessels will find their interest in gaining the Equator as early as possible, without too great a sacrifice of Westing—say, on a S.W. course, continued until in lat. 1° S.—then steer W. by S. to cross the meridian of lon. 80° E. on the parallel of lat. $2^{\circ} 30'$ S. From this position steer due W. until you reach lon. 61° E.; then (steering N.W. about), cross the Equator in lon. $58^{\circ} 30'$ E., and proceed for Ras Hafoon as above directed (under all possible sail). By keeping to the S. (below the Equator) you lessen the strength of the current always against you, and often setting 40 m. per day to the E. Between the 75° and 55° of E. lon., you will also find more favouring winds and easier

sea to the S. of the Equator; and, by crossing it so far to the W., you will be in a favourable position to avail yourself of both winds and currents, when you again plunge into the prevailing bad weather to the N. of the Equator. During the N.E. Monsoon, a direct course for Socotra Island may be steered from Ceylon or Malacca Strait."

The above directions are so sound and practical that we desire to give them the greatest publicity, and commend them to the notice of all navigators leaving (during the S.W. monsoon), the ports of Tuticorin, Colombo, Point de Galle, Trincomalee, Negapatam, Pondicherry, Madras, Coringa, and Calcutta. Steam-vessels leaving Burmah should follow the directions for leaving Malacca Strait, and get to the S. of the Equator before they reach lon. 90° E. From this position (as they have such a long pull to Aden before they can replenish their stock of coal) we recommend them to steer about W.S.W., to get further S. into the S.E. trade-wind, where they will find **favourable currents**, instead of strong contrary currents which are found to the S. of Ceylon and the Maldives, as far as lat. 2° S. throughout the S.W. monsoon, and sometimes (though seldom in July) extending to lat. 3° S., or even 4° S. when the winds thereabouts hang to the W. Thus making what is called the **short S. passage** (see pages 315 and 325), steamers, by working expansively, can husband their coal and set all possible sail for the whole journey after passing the meridian of Ceylon until they make Cape Guardafui.

We hope to see the day when coal depôts and light-houses may be established at Chagos Islands and the N.E. end of Socotra, for the benefit of the Bengal and China trade, as well as that of the Asiatic Archipelago and Australia. The **Sunda Strait** will then become the proper highway for many a steamer homeward-bound, which (whilst the S.W. monsoon prevails in the Bay of Bengal) now hammers against wind and current on an out-of-the-way course to replenish her coal at Point de Galle in Ceylon.

PRACTICAL HINTS ABOUT COMPASSES.

Before the middle of this century, the commanders of steamers of the East India Company, carrying the mails between Bombay and Suez, found that the deviation on each course was not always equal, but altered in different localities. After running for more than a week upon *one* course (W. by S.), from Bombay to Bab-el-Mandeb Straits, and then turning at nearly a right angle up the Red Sea, the amount of deviation of the needle (on the N.W. by N. course) differed from that which had been found to exist whilst the steamer's head was on that bearing in Bombay harbour. Some supposed this to be due to magnetic attraction in some of the hills and islands, but without reason. In iron steamers, this fluctuation of deviation is more liable to occur, and too much attention cannot possibly be bestowed on the compasses. Captain John Steele, of the *Erl King*, has in this matter also given most valuable remarks in the "Nautical Magazine," which being for the benefit of navigators we here give insertion to.

"Steamers, under the close competition of the present day, demand great nicety of navigation and calm energy in command. Those succeeding to steam, from the onerous duties of the sailing ship, will find an impetus to duty in the power so easy of control, and (with the mind released from the anxieties of progression by wind and sail) be free to exercise well trained faculties on their new and less taxing duties. * * * The compass, always important, assumes on board the steamer the leading position. The ship, if new, will be swung for 'compass correction' before starting on a foreign voyage, and 'deviation cards' for each compass handed; but these 'deviations' are liable to derangement from so many causes that they can only be reliable under circumstances similar to those under which the ship was 'swung.' To acquire the confidence so important to success, no opportunity for 'testing the compasses' can be neglected. Of the various methods lately introduced for 'correcting the compasses at sea,' probably Saxby's spheragraph takes precedence. I may add, however, that the instrument is too rudely constructed for the nicer deductions of navigation. But to leave the new and fall back upon the old method, which after all is the best, of amplitudes or azimuths taken morning and evening, and the bearing of the sun at noon (reflected on the face of the compass by the shadow of an erect needle), when the altitude is not too high for an elongated shadow, will give all corrections needed. The 'North Star,' of course, will be brought into requisition at every opportunity. Your compasses adjusted in England may not show any perceptible difference from the 'deviation cards' while N. of the 30° of N. lat., but to S. of this latitude a difference will declare itself, and (as you advance S.) end in the necessity for entirely repudiating your cards. At this stage your practice will give one of two things, pain or pleasure: pain, if neglect embarrasses you in doubt; pleasure, if steady application inspires you with confidence."

"Upon the 'Southerly courses' steered, then—let us say to reach Cape St. Vincent—you may find little error; or, if any, you have had ample time to acquire correct knowledge, but you can

have no knowledge of what your 'error' may be when you alter your course to S.E. for the Straits of Gibraltar, unless you test it before rounding Cape St. Vincent, which test should be taken on the previous evening, if the change of course is necessary during the night; and thus onward throughout the voyage. The corrections for 'Southerly courses' on the coast of Portugal will not be available for the same courses in the Red Sea, nor will the Easterly courses of the Mediterranean bear any resemblance to the same courses in the Gulf of Aden or the Indian Ocean. The intricate navigation of the Straits of Malacca and China Sea requires extra attention."

THE PORTS OF BRITISH INDIA,

(In Geographical Order. Independent or Native, thus (n); Foreign Powers (f) thus).

No.	District.	Description of Port.	No.	District.	Description of Port.
1	Sind	Hubb River	52	Guzerat	Ahmedabad (Sabarmati)
2	"	Kurrachee	53	" (n)	Cambay
3	"	Ghiaree Bunder	54	"	Kerree Bunder
4	"	Gorah Baree (Bunder Vikkur)	55	Broach	Tankaria
5	"	Khetty	56	"	Gunder
6	"	Kotree (Hyderabad)	57	"	Dedj
7	"	Sehwan	58	"	Broach
8	"	Sukkur	59	"	Hansoot Bunder
9	"	Mooltan	60	"	Keem Choky.
10	"	Seir Goonda (Jhuggee)	61	Surat	Oolpar (Bhogwa), (Dandi)
11	"	Busteh Bunder	62	"	Surat (Tapti)
12	Cutch (n)	Lukput (Kori)	63	" (n)	Maundree
13	" (n)	Jakao (Juskow), (Gooria)	64	" (n)	Sacheen
14	" (n)	Mandavree	65	"	Nowaree
15	" (n)	Nawenar	66	"	Mutwar
16	" (n)	Moondra	67	"	Gundavree
17	" (n)	Toona (Anjar)	68	"	Bulser
18	Kattywar (n)	Jooria	69	"	Omeraree
19	" (n)	Balacherry	70	"	Koluk
20	" (n)	Nowa-Nugga (Bayday)	71	Portuguese (f)	Damaun
21	" (n)	Seraya (Kambalia)	72	N. Coconan	Kauli
22	" (n)	Poshetra	73	"	Maroollee
23	" (n)	Beyt	74	"	Omergaum (Sunjan)
24	Cutch (n)	Kutchegud	75	"	Golwad
25	Kattywar	Dwarka	76	"	Dhanoo
26	"	Mianee	77	"	Tarapore (Cheechun)
27	"	Por Bunder	78	"	Aliwada (Nowapore)
28	"	Nuvee (Navi)	79	"	Satputtee
29	"	Seel	80	"	Mahim (Kelvi)
30	"	Mangroole	81	"	Munnoor
31	"	Mandar (Chorwar)	82	"	Dantoora
32	"	Verawul (Somnath Puttan)	83	"	Agansee (Syewann)
33	"	Daumlej (Sutrapara)	84	"	Bassein
34	"	Kolinar (Mhul Dwarka)	85	Bombay	Dharavree
35	"	Vailum (Mandwa)	86	"	Ghoree Bunder
36	Portuguese	Diu	87	"	Versovah
37	Kattywar	Nowabunder	88	"	Mahim
38	Portuguese	Semah	89	"	Bombay
39	Kattywar	Jaffrabad	90	"	Tannah
40	"	Shalbet (Chanch)	91	"	Balaupore (Hog Island)
41	"	Pipalwao Bunder	92	"	Panwell
42	"	Mowa	93	"	Oorun (Woorun), (Caranjah)
43	"	Kootra	94	"	Dhurumtar Bunder
44	"	Sultanpore	95	"	Nagotna
45	"	Perim Island	96	"	Rewas
46	"	Gogeh	97	" (n)	Kolaba (Alibagh)
47	" (n)	Bhownuggur	98	"	Choul
48	" (n)	Soondree	99	"	Cooria
49	" (n)	Baeliaree	100	"	Boba
50	"	Dholera	101	Hutchess (n)	Nandgaon
51	"	Koon Bunder	102	" (n)	Rajpooree (Jinjere)

THE PORTS OF BRITISH INDIA.—Continued.

No.	District.	Description of Port.	No.	District.	Description of Port.
103	Hubehee (n)	Koombaroo (Comrah)	170	Madras	Pudiangadi
104	" (n)	Srewurdun	171	"	Cannanore
106	Bombay	Bancoot (Veshwee)	172	"	Yedcaud (Egnar)
106	"	Mhar	173	"	Durmapatam
107	"	Kelsee	174	"	Talai
108	"	Hernee (Severndrug)	175	"	Tellichery
109	"	Punchnuddes	176	"	Calai (Kalai)
110	"	Dabhol	177	French (f)	Mahé
111	"	Anjenweel (Chiploon)	178	Madras	Chombay
112	"	Palshet	179	"	Mutanguel
113	"	Jyghur (Sytore)	180	"	Badagherry (Wuddakurray)
114	"	Foongoos	181	"	Kottakkai
115	"	Kuryat Newree	182	"	Trekodi (Tikoti)
116	"	Kalbadevee (Meria)	183	"	Cuddalur (Gadalar)
117	"	Rutnagherry	184	"	Kolam
118	"	Pawees (Paos)	185	"	Quilandy
119	"	Pooranghur (Pent)	186	"	Kapatt
120	"	Ambolghur	187	"	Elatoor
121	"	Rajapoor (Jeytapore)	188	"	Pudiangadi
122	"	Sekree Bunder (Toolsoonda)	189	"	Calicut
123	"	Viziadroog (Wagotun)	190	"	Molankadu
124	"	Dewgurh	191	"	Beypore
125	"	Atchera (Achre)	192	"	Cadalundy
126	"	Musoore	193	"	Parparangady
127	"	Malwan (Sirjakote)	194	"	Tanore
128	"	Karlee	195	"	Parony
129	"	Vingorla	196	"	Kuttay (Kootye)
130	"	Reree	197	"	Ponany
131	Goa (S)	Tiracole	198	"	Veliangode
132	Bombay	Banda	199	"	Chowghat
133	Goa (S)	Chapra (Colwol)	200	"	Chitwa
134	" (S)	Agoda	201	"	Attakuye
135	" (S)	Goa (Panjim)	202	"	Kurkuye
136	" (S)	Marmagao	203	"	Maddawyi
137	" (S)	Margao	204	"	Attiprom
138	" (S)	Canacon	205	Cochin (n)	Palipport (Cranganore)
139	" (S)	Polay (Polem)	206	" (n)	Narrakel
140	Bombay	Carwar (Sedashigurh)	207	Madras	Cochin
141	Goa (f)	Anjideva	208	Travancore (n)	Alippee (Aulapolay)
142	Bombay	Benigee (Binghi)	209	" (n)	Porcaud
143	"	Bellikerry (Ankola)	210	" (n)	Kayenkolam
144	"	Gungavelly	211	" (n)	Aibika
145	"	Tuddree	212	Madras	Quilon (Tangachery)
146	"	Coomta	213	Travancore (n)	Anjengo
147	"	Honore	214	" (n)	Vaily
148	"	Batcul (Baticolo)	215	" (n)	Trevandrum (Pootoray)
149	Madras	Sheroor (Seroor)	216	" (n)	Velenjum
150	"	Baindoor	217	" (n)	Colachul
151	"	Naikencotta	218	" (n)	Cadiapatam
152	"	Coondapoor (Kondapur)	219	" (n)	Comorin
153	"	Barcoor (Hungarcutti)	220	Madras	Visiavethee
154	"	Mulpy (Malpe)	221	"	Coolasagarapatam
155	"	Oodiawur (Oodapee)	222	"	Virandnapatam
156	"	Caup	223	"	Coilpatam
157	"	Uchil	224	"	Coil (Kayal)
158	"	Yermal (Ermal)	225	"	Tuticorin
159	"	Pudbidree	226	"	Vypaur
160	"	Moolky (Mulki)	227	"	Vaimbaur
161	"	Mangalore	228	"	Mookoer
162	"	Munjeshwur	229	"	Valinookam
163	"	Coombla (Coomla)	230	"	Yervaudi
164	"	Causergode	231	"	Keelakarry
165	"	Bekal (Baicul)	232	"	Mootapetta
166	"	Caudoutcherri (Katocherri)	233	"	Morekayaputnam
167	"	Kavai (Cavoy)	234	"	Vedauly
168	"	Etticolum (Eli) (Monte d'Eli)	235	"	Mundapum
169	"	Bulaipatam	236	"	Rameswaram

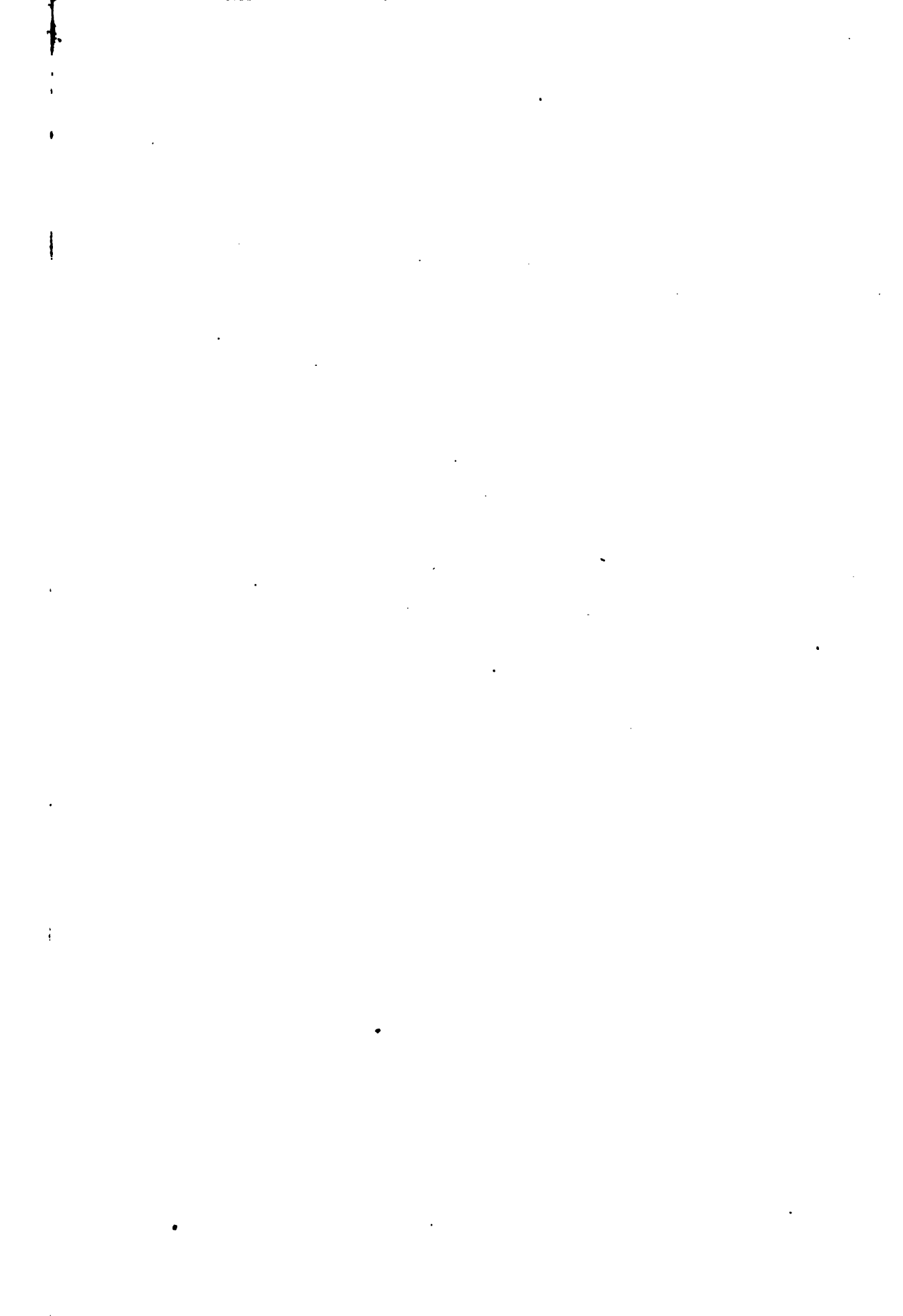
THE PORTS OF BRITISH INDIA.—Continued.

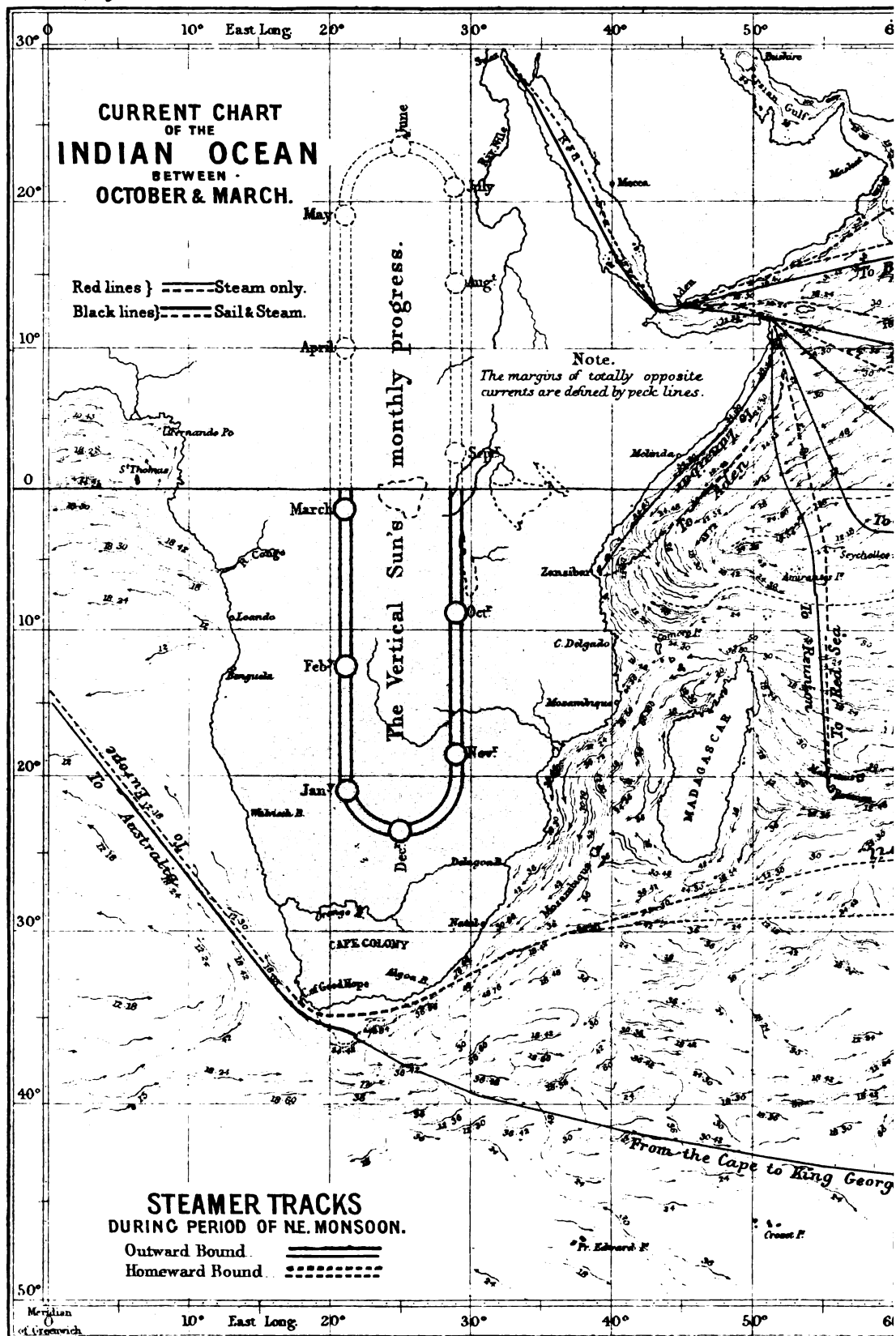
No.	District.	Description of Port.	No.	District.	Description of Port.
237	Madras . .	Paumben	304	Madras . .	Cocanada
238	" . .	Pillamadam . . .	305	" . .	Oopauda (Uppada) . . .
239	" . .	Autankurry (Attengarri) . . .	306	" . .	Pentacottah
240	" . .	Mudiaputnam . . .	307	" . .	Wattada (Wstraw) . . .
241	" . .	Devipatam (Davipatnam) . . .	308	" . .	Pudimadaka
242	" . .	Tirpaulgoodi . . .	309	" . .	Vizagapatam
243	" . .	Ourrancaud . . .	310	" . .	Bimlipatam
244	" . .	Puduputnam . . .	311	" . .	Conada (Konada) . . .
245	" . .	Numbudalay . . .	312	" . .	Santapilly
246	" . .	Tondy	313	" . .	Calingapatam
247	" . .	Damotherampatnam . . .	314	" . .	Bapa-Nowpada
248	" . .	Pasypatnam . . .	315	" . .	Pudi (Poondy)
249	" . .	Sundrapondiapatnam . . .	316	" . .	Barwah
250	" . .	Gopaulpatam . . .	317	" . .	Sonapoor
251	" . .	Cottapatam (Kotipatnam) . . .	318	" . .	Gopsulpoor (Munsoorcotta) . . .
252	" . .	Ammapatam . . .	319	" . .	Ganjam
253	" . .	Kistnajiapatam . . .	320	Bengal . .	Chilka Lake
254	" . .	Cattumavada . . .	321	" . .	Manickpatam
255	" . .	Salnaikpatnam . . .	322	" . .	Pooree
256	" . .	Adrampatam . . .	323	" . .	Davy River (Hurricpoor) . . .
257	" . .	Muttupettai . . .	324	" . .	Coojung
258	" . .	Point Calymere . . .	325	" . .	Cuttack (False Point) . . .
259	" . .	Topitorai	326	" . .	Kunika (Palmyras Point) . . .
260	" . .	Valangany	327	" . .	Dhumrah
261	" . .	Negapatam . . .	328	" . .	Churrimoon
262	" . .	Nagore	329	" . .	Balasore
263	French (f)	Caricull	330	" . .	Peeply (Jellasore) . . .
264	Madras . .	Tranquebar . . .	331	" . .	Contai (Hijellee) . . .
265	" . .	Trimulvassel . . .	332	" . .	Midnapore (Huldee River) . . .
266	" . .	Kodiampolayem . . .	333	" . .	Tumlook
267	" . .	Porto Novo . . .	334	" . .	Burdwan (Raneegunj) . . .
268	" . .	Cuddalore . . .	335	" . .	Calcutta
269	French (f)	Pondicherry . . .	336	French (f)	Chanderagore
270	Madras . .	Mercanum	337	Bengal . .	Mutlah, Canning Port . . .
271	" . .	Chingleput (Palar River) . . .	338	" . .	Morrelgunj
272	" . .	Sadras	339	" . .	Burrysol (Backergunj) . . .
273	" . .	Covelong	340	" . .	Dacca (Narsingunj) . . .
274	" . .	Madras	341	" . .	Comilla (Tipperah) . . .
275	" . .	Ennore	342	" . .	Raipoor
276	" . .	Pulicat	343	" . .	Noacolly (Bulloah) . . .
277	" . .	Poondi (Pudi) . . .	344	" . .	Fenny River (Amlee Ghaut) . . .
278	" . .	Dugarazpatam (Armegom) . . .	345	Chittagong . .	Nisampoor
279	" . .	Tupilli	346	" . .	Chittagong
280	" . .	Pamanjee	347	" . .	Poang-haut (Sungoo) . . .
281	" . .	Kristnapatam . . .	348	" . .	Kootubdeah
282	" . .	Maipadu	349	" . .	Mascul
283	" . .	Varny	350	" . .	Kadgong
284	" . .	Ponnappudi . . .	351	" . .	Cox's Bazaar (Ramoo) . . .
285	" . .	Iskapulli (Eskapilly) . . .	352	" . .	Tek-Nauf (Naaf) . . .
286	" . .	Jualdine (Zuvaladinna) . . .	353	Burmah . .	Myo Tek
287	" . .	Tummalapenta . . .	354	" . .	Akyab
288	" . .	Chenniapalem . . .	355	" . .	Koladyne
289	" . .	Ramiapatam . . .	356	" . .	Arracan
290	" . .	Pakala	357	" . .	Hunter's Bay
291	" . .	Itamukla	358	" . .	Combermere Bay (Aeng) . . .
292	" . .	Kottaputnam . . .	359	" . .	Kyook Phyou
293	" . .	Padurty	360	" . .	Ramree (Amherst Harbour) . . .
294	" . .	Motapilly	361	" . .	Chedooba
295	" . .	Epoorpolem . . .	362	" . .	Toungoop
296	" . .	Nizampatam . . .	363	" . .	Sandoway
297	" . .	Kettapolem . . .	364	" . .	Andrew Bay
298	" . .	Masulipatam . . .	365	" . .	Keintalee
299	" . .	Pondraka	366	" . .	Gwa (Khwa)
300	" . .	Narsipore (Antavedy) . . .	367	" . .	Baumees (Bhaumees) . . .
301	" . .	Bendamurlunka . . .	368	" . .	Khyoung-tha
302	" . .	Coringa	369	" . .	Nga-yot-Koung
303	French (f)	Yanam	370	" . .	Ngan-Khyoung

THE PORTS OF BRITISH INDIA.—*Continued.*

No.	District.	Description of Port.	No.	District.	Description of Port.
371	Burmah . .	Dalhousie Port	386	Burmah . .	Moulmein
372	" . . .	Bassein	387	" . . .	Amherst Town
373	" . . .	Henzadah	388	" . . .	Koola-gouk (Bentinck Sound)
374	" . . .	Prome	389	" . . .	Dermonjai
375	" (a) . .	Ava	390	" . . .	Yay (Yeah)
376	" . . .	Phya-pong	391	" . . .	Hean-zay Basin
377	" . . .	Thou-Khwa (To)	392	" . . .	Moscos Islands
378	" . . .	Rangoon	393	" . . .	Tavoy (Daway)
379	" . . .	Pegu	394	" . . .	Port Owen (Pyeng-boo)
380	" . . .	Toung-noo	395	" . . .	Mergui (Tenasserim) . .
381	" . . .	Kauween	396	" . . .	Aukland Bay
382	" . . .	Sittoung (Sittang)	397	" . . .	Lay-nya (Whale Bay) . .
383	" . . .	Shoay-gheen	398	" . . .	Hastings Harbour
384	" . . .	Beeling	399	" . . .	Maleewan (Mullywoon)
385	" . . .	Martaban	400	Andamans .	Port Blair

It sometimes happens that vessels are chartered in Europe to take freight in goods or passengers to some minor port of British India, not mentioned in any existing Sailing Directory for Indian Seas. We have therefore given the above List of Ports, as they stand in geographical sequence, along the 4000 miles of seaboard of British India; commencing at the W. frontier of Sind, near Karachi, and terminating at the Pak-Chan River, which divides Burmah from Siam.





CHAPTER XIII.

WEST COAST—KARACHI TO BOMBAY.

KARACHI—RIVER INDUS—LAKPUT—KUTOH MANDAVEE—GULF OF KUTCH—BETT—DWARKA—FOR
BUNDER—VERAWUL—DIU HEAD—SHALBET—GOAPNATH POINT—PERIM ISLAND—GOGAH—GULF
OF CAMBAY—MALAIKI BANKS—BROACH—SURAT—BULSAUR—DAMAUN—OMEBGAM—DANOO FOUL
GROUND—TARAPORE POINT—ARNOL ISLAND—BASSEEN—MAHIM—BOMBAY.

(VARIATION OF COMPASS, ABOUT 0° 30' E.)

Ras Muari, or Movari, called by navigators Cape Monze, which bears 18 m. W. $\frac{1}{2}$ N. from Karachi, is of moderate height, and from it the mountain range gradually rises to the N.E. Off the cape a bank projects 1 $\frac{1}{2}$ m. to the S. and S.W., with depths of 3 to 5 fathoms, rocky ground. The island Chilne, or Churna, of a whitish colour, is situated 4 or 4 $\frac{1}{2}$ m. to the N.W. of the cape, having a channel of 6 and 7 fathoms, about $\frac{1}{2}$ m. wide, between it and the bank that lines the coast. The mouth of Hubb River (which has not been surveyed) lies about 5 m. to E. by S. of Churna Island, and most probably shoals will be found off it.

The Coast between Cape Monze and Manora Point is low and sandy, backed by a range of hills of about 800 ft. elevation, which terminate at the cape. The land curves slightly, and all near the shore is foul rocky ground; to avoid which, do not bring Manora Point to the S. of E., or stand in under 10 fathoms, except near Cape Monze, which should not be approached within 1 $\frac{1}{2}$ m., or 15 fathoms water: the channel between the cape and Churna Island is quite safe, with soundings from 9 to 11 fathoms. The Hubb River falls into the sea close to the N. of the cape.

The Direction Bank. The bank of soundings W. of Ras Muari, terminates in lon. 66° E., going off abruptly from 60 fathoms; the bottom is all mud S. from the cape. Outside of 10 fathoms, off Karachi, the bottom is all mud till you come to this Direction Bank, of sand and coral, between 35 to 45 m. S.W. of Karachi, on which the soundings range from 30 to 40 fathoms, sand, shells, and coral; it lies N.W. and S.E., and is 40 m. long. Inside this Direction Bank there is a depth of 43 to 48 fathoms, thence gradually shoaling to Karachi.

Passage down Coast. Steering due S. from Manora Point, the depth gradually increases, from 10 fathoms at 8 m. off, to 20 fathoms at 35 m.; then very quickly to 40 and 45 fathoms, continuing that depth to a distance of 70 m., and terminating at the mouth of that remarkable gut of deep water called the Swatch of no-ground. (See page 338).

After leaving Karachi and getting into 20 fathoms, you should not at night shoal under that depth till the vessel is past the great Munnejah Banks off the principal mouths of the Indus, or till 60 m. below Karachi. Then, bearing away more to S.E., you will get no bottom with deep-sea lead in crossing the Swatch (which is only 4 or 5 m. broad), but immediately afterwards you will shoal to 14 or 15 fathoms on the Koree Great Bank.

KURRACHEE, or KARACHI HARBOUR. This place, increasing daily in importance as the sea-port of Sind and the Punjab, is situated near the base of the S. extremity of the Pubb Mountains, on a level space intervening between them and the sea. Great engineering works are being carried on to deepen the passage over the bar; in the course of these operations, material changes in the bed of the Harbour take place occasionally; but as there is a government Port Officer stationed at Manora, who berths the shipping and attends to their movements, no inconvenience can be experienced. The population of Karachi and the suburbs is about 35,000, and steadily increasing with the importance of the place; the Sind Railway bringing it into speedy communication with Hyderabad. The native exports are camels, saltpetre, salt, rice and other grain, ghee, hides, tallow, oil, oil-seeds, salt fish, bark for tanning, alkalies, indigo, cotton; also horses from Cabul and the adjoining countries. The imports are metals, hardware, cottons and silks, twist and yarn, and recently much railway plant and European goods.

The Harbour is formed by the low land running down to Manora on the W. side; and on the E. side by the newly-constructed stone groyne along the sandy spit extending from the W. end of Keamari. The width of the harbour varies from 350 to 800 yards, but above the Round Tower it

is divided into two channels by the "Middle ground." To the E. of Keamari groyne the water is all shoal, with soundings from 4 to 6 ft.; there stand the **Oyster Islands** (called Andai by the natives) which are mere rocky islets, with 8 to 10 ft. water round them. South Island bears from the flag-staff E.N.E. $\frac{1}{2}$ N. rather more than 1 m. distant, and is about the same height as Manora Cliffs; the others are lower; the centre of the three smallest is called Pyramid Rock. The S. extremity of the **Keamari groyne** bears about N.E. by N., and is $\frac{1}{2}$ m. from Manora Fort.

Manora Point is a perpendicular rocky cliff about 90 ft. high, forming the extremity of a low sandy ridge, which bounds the W. side of Karachi Harbour. It has several bungalows and a flag-staff on it, and an old fort, on which is the light-house.

Light. Manora Light-house,* in lat. $24^{\circ} 47' N.$, lon. $66^{\circ} 58' E.$, shows a *fixed* light, 120 ft. above the sea, visible in clear weather at 17 m.; but, in the hazy weather of the S.W. monsoon, it is not often seen beyond 7 to 9 m.

Pilots. Masters of ships should not, under any circumstances, attempt to enter Karachi Harbour without a pilot. The light-house point may be approached to within $\frac{1}{2}$ m., on any bearing between N. and E., into 5 fathoms, water. At certain times of the tide pilots cannot get off, therefore, attention should be given to all directions signalled from the shore.

The Deep-water Point (of former days), which formed an elbow along the E. shore of Manora, at $\frac{1}{2}$ m. to N. by W. of the light-house, has now been much cut away in the course of engineering operations. **Manora Breakwater** is intended to be carried out for 1,000 yards to the S. by E. from the light-house. About one-third has been done, and eventually the light-house will be at its tip.

Keamari Island, extending in a direction nearly E. and W., $\frac{1}{2}$ m. in length, and 250 to 350 yards in breadth, is low and sandy, with a ridge running along the N. edge. Off the W. end, called Keamari Point, the water is deep, having 20 to 25 ft. close off the jetty; but the channel is not more than 200 yards broad. Keamari Point is now connected with the main land by a strong stone causeway, or mole, commenced by Sir Charles Napier, and finished in the year 1853. This work has greatly facilitated the communication with the town and camp, as formerly all goods and passengers were obliged to be landed at the town, which could only be effected at H. W., and then only with great trouble and difficulty. The causeway has had the effect, however, of filling up the Town Creek, so a new native jetty has been built to S.W. of the Custom-house, and deep water is maintained off the tip of this jetty by a scouring channel under the Napier Mole Bridge, by which the stream of the Chinna Creek Backwater escapes into the harbour.

The channel between Keamari Point and Baba (the fishing village, 7 cables to the W., opposite) is divided by a sand-bank with only 2 or 3 ft. over it in the shoalest parts. The Baba Channel turns away to the W.N.W., with a considerable depth and breadth for 3 m., when it gradually diminishes, and is finally lost in a large swamp.

Chinna Creek opens at the E. end of Keamari Island, $2\frac{1}{2}$ m. to the N.E. of Manora Point. A railway bridge now crosses it, and below it the bank is built solid up to half-tide level.

The Bar. There were formerly two channels into Karachi, but the harbour-works have now produced one straight passage, through which vessels of a certain draught (presently to be mentioned) can make the direct run into harbour with the sea-breeze. The shoalest part of this *fair channel*, or what is usually known as the Bar (which is now about $1\frac{1}{2}$ to $1\frac{1}{2}$ cable-lengths to the E. of the extreme S.E. tip of Manora Rocks,) has now 16 or 17 ft. at L. W., and a gain in depth is expected, as the Manora Breakwater is carried further out. Directions for entering will of course differ with every year's progress, and due notice will (as now) be given by the Port Officer or Master Attendant.

Anchorage off the port may be had with the light-house between a N.E. and a N. bearing, in soundings from 7 to 5 fathoms, sand and mud. Very strong W. winds occur after Jan., and render the anchorage outside very unsafe.

Vessels should not anchor off Karachi in the S.W. monsoon, if it can possibly be avoided; but, if necessary, the best anchorage is with the light-house N.E. by N. to N.E. by E., from 1 to $1\frac{1}{2}$ m. off, in 7 to 8 fathoms, sand and mud. A long scope of cable should be veered at once. The *Sea Queen* lost two anchors, and the *Ann Black* and the *Eliza* each lost one, in the year 1854. Vessels should not anchor anywhere to the S., however fair the weather may appear.

DIRECTIONS for KARACHI HARBOUR. In the fair-weather season, Nov. to Jan., after passing Munnejah Bank in 10 to 12 fathoms, the coast may be approached anywhere to 7 fathoms, and good anchorage may be obtained, if required. Manora Point will generally be seen from 15 to 16 m. off, but sand-squalls from off the land make it indistinct sometimes, and you may steer for it on any course between E. and N. by W. A *Red* burgee at Manora flag-staff head, indicates H. W.; but a *Blue* burgee shows L. W.; *Red* at yard-arm when flood tide; *Blue* when ebb.

* The light will be removed to the tip of the breakwater, when finished.

During the S.W. monsoon vessels should make Ras Muari (Cape Monze) which is 18 m. to the W. of Manora Light-house, and keep to windward of the port if the weather is thick, or if the tide should not suit for crossing the bar. Bear in mind the probability of a strong set to the S.E. Do not bring Manora Point to the S. of E., or go under 15 fathoms near Ras Muari. Near Manora Point a vessel may stand into 10 fathoms. If to the S. of the port, do not go under 8 fathoms, or bring Manora Light-house to the W. of a N. bearing.

Outward bound in the S.W. monsoon, it is advisable to work off to the W.S.W. into above 15 fathoms, or 10 m. from the light-house, before shaping a course to the S. For, although a vessel might lie along shore, direct from the mouth of the harbour, she would be very likely to get into difficulties, from the wind falling light, or the flood setting in towards the mouths of the rivers. In passing the Munnejah Bank, she should not be in less than 20 fathoms, or not more than about 2 m. E. of the meridian of Manora Point.

The coast of Sind below the parallel of 24° N. lat., should be approached with great caution—20 fathoms water being found (in places) within 2 m., and 10 fathoms water close to the outer edge of the banks, which extend to the S.W. from the Kukiwari mouth of the Indus. The set of the tides and currents off these banks is very uncertain; the land is low throughout, and barely visible in clear weather from the outer edge of the banks. *Too much attention* cannot be paid to the lead on this coast, more especially in passing the banks off the Indus. The ship, *Admiral Boxer* was totally lost, and the *Thomas Campbell* and *Augusta*, with the steamer *Pioneer*, grounded there, but were eventually got off. Two large troop-ships touched there.

To the N. of the above parallel caution is still necessary, and the coast should not be approached under 14 fathoms; this line of soundings will carry a ship from 7 to 9 m. only off the Hajamri and Kediwari banks of the river, 10 fathoms being found in places close to their edge.

The S.W. monsoon seldom blows hard in the vicinity of Karachi. The general direction is W. to W.S.W., liable to squalls from N.E. and S.E., with rain, particularly in July.

Draught of water. Masters of ships leaving England, or any other port, bound for Karachi, will do well to bear in mind that during the months of June, July, and Aug., and part of Sept., no ship should arrive off Karachi with a greater draught than 18 ft. at spring-tides, or 16 ft. at neaps. Ships more deeply laden than that are apt to bump on crossing the bar, and to do serious injury to themselves. June, July, and Aug. at Karachi are S.W. monsoon months, when there is bad weather, and always a troublesome sea. Ships arriving, or expecting to arrive off Karachi, during the above months, should not anchor in the Outer Roads if it can possibly be avoided, by keeping off and on, with the light-house between N. by E. and N.E., until the H. W. time permits their crossing the bar. Many ships have lost their anchors by anchoring in the Outer Roads during the S.W. monsoon. The depth of water on the bar is always signalled to every ship on arrival, from a small flag-staff on Manora Point, a little to the right of the high flag-staff; and, if practicable, a pilot is always sent off, to pilot ships over the bar to the anchorage.

Ships arriving off Karachi from the middle of Sept. to the end of May, may draw as much as 20 ft. at springs, and 18 ft. at neaps, but not more.

Ships leaving Port in the S.W. monsoon, may load during spring-tides to 17 ft.; but at neaps to only 15 ft.

The above difference in draught, between vessels entering or leaving port during the S.W. monsoon, is explained by the fact that, in proceeding out, ships directly *head* the swell, and consequently pitch deeper and are far more liable to bump than vessels of the same draught running before the swell into port. There are days during the S.W. monsoon when the sea on the bar is so heavy, that ships at the above draught cannot with safety cross, and it is advisable that vessels of from 600 to 800 tons burden only should be sent out, so as to arrive during the bad weather season. Steamers of larger burden can enter at the above draught.

Making the land. Vessels from London, or from the W., bound to Karachi, should not in the Westerly monsoon make the coast of Sind and Kutch, or any of the contiguous land whatever, previous to sighting Karachi Light-house; but, should they do so, and find they have to beat up to Karachi, they should not come under 14 fathoms.

No attempt should be made by strangers to cross the bar at night; only steamers do it with old practised hands. If the weather permits, a pilot usually comes off to take the ship in; but, in case one does not, the directions will, if attended to, enable the master of any ship to take his vessel in himself, when the bar is marked by buoys.

THE SIND COAST runs about S.S.E. for 50 m. from Karachi; and then from the mouth of the Kediwari to the N. bank of the Kori, or Lukput River, it takes a general S.E. by E. direction for 60 m. The shore is low and flat throughout, and at H. W. is partially overflowed to a considerable distance inland. With the exception of a few spots covered with jungle, it is entirely

destitute of trees or shrubs, and nothing is seen for many miles but a dreary swamp. Wherever this occurs the land is scarcely discernible at 3 m. from the shore, except where bushes exist, and they can be seen at double that distance, and at L. W., when of course the land has 6 or 8 ft. more elevation, they are visible 7 or 8 m. from aloft.

In the vicinity of Karachi the land is higher; and to W. of that place, the high range of mountains, terminating in Ras Muari, unmistakably point out the W. extreme of the Sind coast, and may be seen in clear weather many miles off. On a coast so devoid of objects, and sometimes partly submerged, it is often difficult to distinguish the different mouths of the Indus, and but few directions can be given to assist the navigator in finding them. The Seer is known by some sand-heaps topped with bushes on its N. point, which are sufficiently elevated to be visible some distance; the Kutch pilots call this point **Doupe**, and always stand in to sight it before they steer for the Munneja Bank. There is a similar spot at the Richel mouth (called **Richel Grove**), which also serves as a guide to approach the Hajamri, whose changing mouth lies from 2 to 4 m. to the S.W. of the trees.

The shore of Sind is everywhere low, and difficult of approach for vessels of a deep draught; a narrow belt of sand-hills generally forms the sea face, backed by dense patches of mangrove jungle. Of these bushes there are several varieties; some are extensively cut as fuel for the Karachi mart; another kind is used by the Mohanee tribe for the preparation of charcoal; the bark is also valuable for tanning purposes. Beyond these sand-hills and mangroves little else meets the eye of the passing mariner. During the heat of the day a peculiar haze hangs over the land, which makes it very difficult to recognize even these more than 4 or 5 m. off. It was found from actual observation that the flag-staves could be seen double the distance in the mornings, or before the light alluvial sand was sufficiently dry to be moved by strong winds, for the air generally holds it in suspension when the fresh breezes prevail. Few supplies of any kind can be procured near the coast. Wells of brackish water may be found a short distance from the different mouths.

THE RIVER INDUS. Some little general description having been given of this noble river in the last chapter, mention need only be made of its 13 or 14 mouths. The main river, after passing Hyderabad and Tatta, divides about 50 m. from the sea into two grand arms, the Buggaur and the Setta. During the dry season (from Oct. to March) no communication exists between the former and the main stream, owing to the accumulation of a sand-bank at the confluence; but the Setta, called also Munneja or Waniani, pursues the same course to the ocean as the great river, having its efflux by the Kediwari and Kukiwari mouths, whose entrances with their impetuous currents and shifting sands are carefully avoided by coasting craft, which make use of the Hajamri and Jua mouths, as the easiest to enter, although none are marked.

The Coast. Between Manora Point and the Hajamri, the coast is all low, intersected by numerous channels and creeks, which afford a safe though rather circuitous communication between the main river and Ghisri Bunder, at all seasons. As none of the mouths of these channels are navigable except for vessels of very light draught, and moreover are not marked being subject to annual changes, it is unnecessary to describe them at much length. The coast line has a general direction of S.S.E. from Manora Point, to the N. edge of the Munneja Bank. Vessels may stand in anywhere to 7 fathoms, during the fair season, except off the mouths of Hajamri, Kediwari, and Kukiwari. The bottom is mud and black sand.

Indus Steam Navigation. After coming down the main branch of the Indus from Hyderabad, the river steamers debouch at the Kediwari mouth, then enter the Richel, and navigate towards Karachi by the Bua, the Jua, the Gorabee, the Dubba, the Mull, the Kalari, the Pitiani, the Rahu or Piti, the J'hiri, the Charu, the Kadru, and the Ghisri, where the creek navigation unfortunately terminates, about 3 m. short of Karachi town. Now that a small class of steamers, to which these mouths are available in cases of accident, also the Indus steamers to and from the port of Karachi, are trading along this coast, it is important to navigation that these places of refuge be made known and properly beaconed.

Ghisri mouth is shoal, there being no more than 2 ft. at L. W. The bar extends for some distance, which makes it difficult of entrance, while inside there are found 3 or 4 fathoms water: this is perhaps the worst defined of the different embouchures. The steamers of the river Indus, bringing produce from the Punjab, are unable, without going out to sea, to get nearer to Karachi than Ghisri Bunder, which places are 4 m. apart; this sea voyage (though of only 4 m.) is a very trying and hazardous experiment for the light-draught vessels that are used on that river.

The Pitti is one of the largest, the deepest, and best defined of these several mouths, and is generally frequented by the Indus steamers to and from Karachi. On the S. side may be seen high sand-hills. Near these are erected two flag-staff beacons on an inclined plane; the upper one is 56 ft. and the lower one 50 ft. above the level of the sea: these may be seen in the offing six or

seven miles, or in 8 fathoms of water. The true bearing of one flag-staff from the other is N.E. by E., distance 454 ft. By bringing these marks on, or in this line of bearing, a vessel will lead in the fair way over the bar, and well up the channel. This course may be steered until the S. bank is seen : by keeping in a parallel line with this shore no difficulty will be experienced.

Kudi mouth has 5 ft. at L. W. ; its sand-banks are everywhere so low and flat, that this mouth presents a very extensive appearance, adding much to its navigable difficulties. The only natural mark is a high sand-bluff on the N. shore, about $\frac{1}{4}$ m. from H. W. flow. This stream communicates with the Buggaur, and, during the swell of the Indus, discharges fresh water. People are here employed fishing for pearl oysters, with which many of the beds of these tide channels are studded. **Kai** is a small mouth leading into the Pitiani. **Pitiani** communicates with the Buggaur, or W. arm of the Indus. At this mouth little difficulty would be experienced in entering, it being better defined than most of these mouths, but buoys or beacons are needed. This stream discharges fresh water during the swell of the Indus.

The **Jua**, or **Sisla mouth**, is 5 m. N.N.W. of the Richel Grove. The **Richel**, a considerable stream to the N. of Hajamri, has now a common embouchure with the latter ; on the N. of its entrance there is a grove of trees (Richel Grove) which forms a good land-mark, as there are no others so high in the vicinity.

THE HAJAMRI, in 1846, emptied itself into the sea by the same channel as the Kediwari, but in 1849 it was found to have turned to N., and, after joining the Richel waters, to enter the sea about 8 m. to the N.W. of the Kediwari beacon. The beacon at the mouth of the Hajamri was only 2 m. N.W. of the Kediwari beacon. The Richel trees are the best land-mark. The Hajamri and Jua mouths, during the low season, are independent of fresh water discharge, rendering them safe channels for ingress or egress, and are those generally frequented by native vessels drawing not more than 6 ft. ; still, like all the rest, they are entirely destitute of beacons or natural landmarks so indispensable for the safe guidance of the mariner.

Tides. Off Hajamri mouth it is H. W. at F. and C., about 9 h. 40 m. : rise and fall 8 ft., at ordinary springs ; but 9 or 10 ft. sometimes.

Ruins. On the left bank of the Jhirri there are the ruins of a strongly built fort and town ; also, on the right bank of the Rahu, one of similar construction, named Lohari : this is concluded to be the Lowry or Lahori Bunder of Captain Hamilton, who landed hereabouts, on his visit to Tatta, about the middle of last century. The bricks are very similar to those made in the country at the present day ; the buildings are of a square form, about 120 yards, with three bastions on each face. From the mass of ruins, several copper coins of various shapes were collected, all apparently of barbarous origin. These places, no doubt flourished upon one arm of the Indus, falling into decay as the river assumed a more E. course.

The **Swamps** of the Lower Indus are less productive, in the way of obnoxious reptiles and quadrupeds, than most large deltas ; beyond a few prowling jackals and hyenas, little exists, but in the cold season myriads of ducks, geese and other water-fowl are seen. The salt-water worm (*Teredo navalis*) is destructive in a most extraordinary degree, to the bottoms of boats, timber, &c. In the short space of six weeks, it was found they had penetrated teak plank fully half an inch. So well aware of this are the fishermen that they lay their boats aground every 10 days, coating their bottoms with fish oil, which is considered by them a good preventive.

THE GREAT MUNNEJA BANK extends 6 to 7 m. off shore, from the principal mouths of the Indus, and occupies a sea face of 20 m. in extent, between the Kaha and Jua mouths. It is formed by the alluvial deposits of the River Indus, the sea face having the usual fringe of hard sand ; the W. edge of the bank is very steep, having 5 fathoms at $\frac{1}{4}$ m., and 10 fathoms at 2 m. distance. The ebb tide rushes out strong, causing a high ripple, which would very probably be mistaken at night for shoal water : particularly at the junction of salt and fresh water, the sea has a whitish and sometimes at night a luminous appearance. During the inundation the water is frequently fresh at the mouths of the river ; and a vessel at anchor will often have good fresh water, though muddy, on one side, and clear salt water on the other ; the boundary line of the two waters is observable several miles out at sea. At various parts of this extensive shoal, distant from the immediate influence of discharge, there was found mud stratum so thickly deposited, that a boat's oar might be forced down its whole length with apparent ease. Some parts of these banks are more elevated than others, evidently increasing from sand-banks to islands of more permanent formation, with an upper stratum of mud and long grass.

During the swell of the Indus, and at high tides, the surrounding country is nearly submerged ; the cultivators raise *bunds*, or embankments, round their huts, and are not unfrequently 2 or 3 ft. below the surface ; at times they are driven to their boats, seeking refuge in more elevated parts of the Delta. Since the survey made in 1849, that part of the shoal in the vicinity of the

old Kediwari mouth has increased some miles upon the ocean. This of course might be anticipated, considering the immense quantity of alluvial deposit held in suspension, with the enormous discharge from the Indus River.

Vessels passing up and down the coast in the vicinity of the Kediwari shoal, should not approach by day nearer than 10 fathoms water; or by night 14 fathoms. The breakers or surf, although indicating approximation to the shore, are no sure guide during the months of Nov. and Dec. The surveyors frequently landed upon different parts of the reefs and coasts, without experiencing a ripple or a wave; at other intervals the breakers are heavy, and may be seen and heard some distance in the offing. The coasting craft invariably avoid the Kediwari mouth,—impetuous currents and shifting sands are dangers they are not disposed to encounter. Sharp vessels, grounding on such a locality, seldom escape serious disaster, a few hours being sufficient to engulf them in a bed of sand from which no human aid or skill can extricate them. The projecting point of coast, between the Kediwari and Hajamri mouths of the river, was marked by a beacon. This beacon fell down early in 1856, and had not been put up again in March 1857. Its position was in lat. $24^{\circ} 18' N.$, lon. $67^{\circ} 20' E.$, bearing E. about 7 m. from where the bar was in 1848, at the mouth of the main channel. The entrance was then narrow, and divided into two channels, with a depth of only 3 ft. at L. W. springs.

THE KEDIWARI was, till 1849, the main branch of the river Indus, discharging the greatest body of fresh water. This mouth altered its bearing six points to the S. of the Kediwari beacon, during the inundation of 1848: the channel is altered every year, so it is needless to describe where it used to be. The bar itself is composed of fine alluvial sand, apparently hard, and offering great resistance, but readily yielding to the force of the capricious and ever-changeable stream: these hard sand-banks only exist in the vicinity of strong currents.

THE KUKIWARI is the S. mouth, which now discharges over the Munneja Bank an immense body of fresh water; thus the S. end of that bank is rapidly advancing upon the sea in a S. direction, towards that deep chasm, called the Swatch, up through which a vessel might stand on a N.N.E. course without being able to get soundings even with the deep-sea lead; then she might suddenly shoal in the course of a few minutes (if sailing fast) to 10 fathoms, and then take the ground before getting another cast of the lead.

Caution. We therefore warn all navigators against the increasing dangers off the Kukiwari mouth. The survey by Captain A. W. Stiffe, in 1867, shows that mouth to be in lat. $23^{\circ} 50' N.$, lon. $67^{\circ} 25' E.$, and we may naturally expect that in 5 years it has decreased the latitude by some 2 or 3 m. The Mull and Waree mouths, which are not navigable or approachable, are now left in a deep bay between those of the Kukiwari and the Seer.

SEER MOUTH. The bar of the Seer river is in lat. $23^{\circ} 34' N.$, lon. $68^{\circ} 6' E.$ A long narrow spit, mostly dry at L. W., extends 6 m. from the N. bank of the river, on which the sea generally breaks very heavily. The channel runs along the E. side of this spit, with a depth of 2 to 4 fathoms; the least water on the bar is 5 ft., with a rise and fall on the springs of 11 ft. H. W. at F. and C., 10 h. 30 m. The Seer is navigable for nearly 50 m. from the bar, with a general depth of 3 and 4 fathoms, and nowhere less than $1\frac{1}{2}$ fathom. The connection between the upper waters of the Seer and the Indus is cut off by a bund, or embankment, at Mughrabeen, constructed for the purpose of confining the water of the Gungra, which otherwise was not sufficient for the irrigation of the land on its banks. Consequently all the land between Mughrabeen and the sea, in fact from Lukput river to the Indus, is a vast expanse of desert land, in many places as level as the sea itself. The lower waters of the Seer are connected with the Indus by the P'hukkar, apparently navigable, but not explored. At Jhuggi, or Seer Goonda, the furthest navigable point of the Seer, it is H. W. on F. and C. at 1 h. 30 m.; rise and fall 6 ft. Off these rivers the tides at the bars set fair in and out, and at 10 or 12 m. off, the ebb sets W.N.W., and flood E.S.E., about $1\frac{1}{2}$ m. per hour on the springs, but much weaker on the neaps.

The Coast from Seer river mouth trends N.W. by W. 37 m. to the S. part of the Munneja Bank. The soundings are regular throughout: vessels should not stand into less than 7 fathoms (L. W.) with safety. The Kaha, Mull, and Wari rivers are included in this space, but they are without any land-marks, and not navigated at present by native vessels. Towards the Munneja Bank the soundings become deeper, and vessels should not stand in under 10 fathoms, as the edge of the bank is steep.

The SWATCH of no-ground. At the distance of about 35 m. W. of the Seer mouth, and about 5 or 6 m. to the S. of the great Munneja Bank, the chart shows the N. extreme of that singular deep chasm in the ocean bed, called the Swatch; so named after the similar one off the Sunderbuns of Bengal, about midway between Point Palmyras and the coast of Chittagong. The Swatch is a narrow gut of very deep water, from 3 to 5 m. in breadth, extending in a N.E. direc-

tion from the deep sea to within 15 m. of the Mull mouth, and looking like a seaward extension of one of the great arms of the River Indus below the city of Hyderabad. In the upper or N. part soundings may be obtained from 50 to 100 fathoms: but none in the lower part at 200 fathoms. On the N.W. side the soundings are from 30 fathoms, at the distance of 20 m. from the coast, to 50 fathoms about 45 m. off. But the S.E. side is much shallower, having only about 20 fathoms within 2 m., and decreasing to a flat of 14 to 16 fathoms mud; this flat extends to a distance of 50 m. off shore, and is connected to the Lushington shoal and to the coast of Kutch; the natives call it the Lukput or Kori Great Bank.

The **Kori Great Bank**, or the Sind-Kutch Bank of soundings, has 20 fathoms at the distance of 60 m. to the S.W. of the mouth of the River Kori, or Lukput, which is the boundary between Kutch and Sind; thence it gradually shoals towards the coast, having soundings of 10 fathoms at about 20 m. off. On this great bank to the E. of the Swatch, there are little patches of 12 or 13 fathoms, here and there, some even near the outer edge of the bank, or 50 m. from the coast; and about 5 m. outside of them a depth of 50 fathoms is found; thus showing the W. edge of this bank to be very steep-to.

COAST OF KUTCH, or Cutch, now written **Kach**. That part of the Kutch coast which is outside of the Gulf of Kutch, together with the coast of Sind, make a distance of 200 m. from Mandavee to Cape Monze, or Ras Muari. The whole of this sea board from Mandavee to Karachi is low, and in many places swampy, and not visible from a vessel's deck when she is as near the land as safety permits. The Kutch coast, which is between 60 and 70 m. in length, has 2 or 3 hills which are good land-marks; but the Sind coast for more than 100 m., has none whatever. The Feb. fogs of the Gulf of Kutch also prevail along this coast.

KORI, or LUKPUT RIVER. The Kori is by far the broadest of the Indus mouths, being 3 or 4 m. across in a length of 30 or 40 m., and therefore more properly described as an arm of the sea. By a careful study of the historians of Alexander's campaign, of the travels of the Chinese pilgrims, and of the Ayeen Akbari, General Cunningham, the archæologist, has collected most interesting evidence respecting the former history of the Punjab rivers and of the Lower Indus; this is noticed by Mr. Clements Markham in his "Memoir of Indian Surveys."

At the time of Alexander's invasion, and down to the visit of the Chinese pilgrim, Hwen Thsang, the river Indus flowed to the E. of its present course, down the bed now known as the Eastern Narra, thence out to sea by the Korea mouth. This accounts for that extensive mud flat which we have called the Kori Great Bank. At last, in about A.D. 680, the Indus cut a passage for itself through the limestone rocks between Roree and Bukkur, and so passed down by (what is now) Hyderabad, and thereafter burst into the sea some 60 m. more to the W., or not far from its present embouchure. Then was deposited all the alluvial matter which forms the shoal water to the W. of the Hajamri mouth, and thus was left (between this and the Kori Great Bank) that remarkable deep gut, which we call the Swatch of no-ground, and of which we venture to predict that in a century hence there will not be a trace left.

At the mouth of the Lukput river, in 3 fathoms, the low land is not visible from the deck; but, if the weather is clear, a table-hill, called Munnerah, may be seen bearing E. by N.; the banks are very extensive, and, from the absence of land-marks, it is impossible to give any direction for the navigation. The river is navigated by a few native vessels as far as Lukput, which was once a place of great trade; but since the communication of the river with the Indus was cut off, partly by the artificial erection, and partly by the natural formation of a great embankment, called the Ullah Bund, its trade has dwindled away, its houses are tenantless, and altogether it presents an aspect of melancholy and decay. The Kori and Seer rivers have been surveyed as far as they are navigable, and the creeks between those rivers and the P'hukkar river, connecting the Seer with the Indus, and thus forming a direct inland water communication between Jakao and Karachi, have also been examined.

The Bar. The least water on the bar of Lukput river, at L. W. springs, is 6 ft., with a depth inside varying from 9 to 3 fathoms. The breadth of the river from bank to bank is about 3 m., but the channels are contracted to about 1 m. on the bar.

GOORIA, or JAKAO Creek (Juckow), may be known by a small mound at its entrance, in lat. 23° 16' N., lon. 67° 34' E. The least water on the bar, at L. W. is 5 ft. with a rise and fall of 8½ ft.; H. W., on F. and C., 11 h. To enter the creek, small vessels or boats, must cross the bar with the mound bearing N.N.E. ¼ E., and keep in that line till the point E. of the mound bears N.E. by E.; then stand for the latter point, keeping 100 to 150 yards off shore, and, when abreast of it, you may go away E. for the deep-water point on the S. side of the river, and bring up in 3 or 4 fathoms. At the distance of 1 m. above deep-water point there is not more than 5 ft. at L. W., but the native boats proceed 3 m. further up to discharge and receive cargoes. The town of

Jakao is between 3 and 4 m. further still from the bunder. At Gooria Creek the E. delta of the Indus terminates.

From Gooria to the N.W. the coast line is much indented, the land is very low and intersected with creeks, the mouths of which are shallow. The shoal water line trends pretty straight on a N.W. bearing for 20 m. to the entrance of Lukput River.

The Coast of Kutch from Gooria, or Jakao Creek, trending S.E. by E. almost straight for 43 m. to Assar Pagoda, is uniformly low, and protected from the sea by a narrow sandy ridge, averaging 30 ft. in height, but near Assar some 70 or 80 ft. high. Villages are numerous and the land well cultivated. The water gradually becomes shallower, to a greater distance off shore, in going to the N.W.; but no dangers of any kind exist, and vessels may stand in to any convenient depth, as it shoals very gradually, except in the vicinity of Assar. The bottom is either mud or black sand, and very good holding ground. There are no ports along this coast.

NAVIGATION FROM KATIAWAR COAST TO KARACHI.

The soundings of the Sind and Kutch coasts cannot fail to be an excellent guide for the mariner. The coast of Kutch is about 40 m. to the N. of Dwarka point, and from that point, (which has so excellent a land-mark as the Dwarkanath Temple, visible 17 m.) a vessel, bound to Karachi, after having hugged the Katiawar coast in the N.E. monsoon, should take a fresh departure. The 30-fathoms line and the 20-fathoms line of soundings, between Dwarka and the Swatch of no-ground, are very close together, and the 15-fathoms line is very close within the latter sounding; then the depth more gradually decreases to 10 fathoms, which depth of water runs along on a tolerably straight N.W. bearing from Lushington Shoal to the Kediwari mouth of the Indus.

But, as the depths of 10 fathoms are found on the bank which extends a dozen miles to the S.W. of Lushington Shoal, it is a safe rule, not to bring Dwarka Temple to bear S. of E.S.E. while it is in sight from aloft; or, if at night, till you reckon the vessel to be more than 20 m. from it* on that bearing; thus you will pass over the deep water between it and the Lushington Shoal, and get soundings with the hand-lead on the bank to S. and W. of the latter. Then, proceeding onwards across the mouth of the Gulf of Kutch, do not shoal your water under 15 fathoms till in the latitude of Kutch Mandavee, when you will be to N. of all outlying shoals, and will find an extensive flat, the Kori Great Bank (having 15 to 12 fathoms) right onwards to the edge of the Swatch. In this latter deep gut you will not be able to get soundings with the deep-sea lead, if the vessel is not hove-to.

The Coast of Kutch in the vicinity of Assar Pagoda, and several miles W. of it, has two very good land-marks visible in clear weather; a round hill called Nanao, or Nunnomar, bearing due N. 23 m. from Mandavee Light-house; and a sharp peak, called Kerri Kubbah, bearing N. $\frac{1}{4}$ E. 18 m. from Assar Pagoda. These hills are nearly in a line, and visible in clear weather, when bearing E. by N., when the vessel is on the 8 and 9 fathoms flat to the S. of Jakao.

The line of 9 fathoms (L. W. depth), which is found about 1 league to W. by S. of Assar Pagoda, runs due W., along the parallel of latitude of Mandavee light, for a distance of 40 m. A vessel working against W. winds, with the ebb tides, from Mandavee towards Karachi, might conveniently keep along this flat; on the off-shore tack, not deepening her water beyond 11 fathoms, and standing in for a good way over the flat to 7 fathoms; thus she would by the lead alone and at night, make sure of passing well to the N. of the Lushington Shoal, which is 33 m. W.S.W. of Mandavee, and the only danger off shore besides the Ranwara shoals.

TIDES. All across the mouth of the Gulf the bottom is very uneven, and the rapid tides cause a very confused breaking sea, even in a depth of 30 fathoms. At Assar Point, it is H. W. on F. and C., at 12 h. 0 m.; ordinary springs rise and fall 12 ft.; very high springs 15 ft.; on the neaps, about 8 ft.; velocity, 3 to 4 knots per hour. When crossing the mouth of the Gulf of Kutch, great care should be taken to make due allowance for the set of the tide. Off the mouth of the Gulf it is H. W., at F. and C., at 11 h. 30 m.; flood sets E., 1 to 2 m. per hour, and ebb W. about 1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ m. per hour, just outside of Lushington bank.

By Night. Ample allowance should be made for Tides when making Dwarka Point from the N. at night; vessels should shape a course to pass full 10 m. clear of it. The soundings are no guide, as you may have 18 fathoms at 2, at 10, and at 17 m. off; but, within 10 m., the bottom changes from mud to sand and shells; and near the shore it is all coral: for which reason there is no good anchorage in the vicinity of Dwarka.

* A Light-house on Dwarka Point was recommended more than twenty years ago, by Commander Albany Grieve, one of the most distinguished surveyors of the late Indian Navy.

THE GULF OF KUTCH.

(VARIATION OF COMPASS AT BEYT, $0^{\circ} 40'$ E.; AND AT JOORIA $1^{\circ} 30'$ E.).

The Gulf of Kutch has been hitherto looked upon as a dangerous place for a vessel to get into; but is now known to possess some harbours and anchorages already affording shelter, whilst many others possess natural advantages which may ultimately claim for them the notice of English merchants, desirous of procuring cotton from the N. side of the Katiawar peninsula. The coasts of the Gulf are uniformly low; the N. shore consisting of sand and mud, whilst the S. one is fronted with islands, which are covered with brushwood, and surrounded by coral reefs. The coast between Assar and Mandavee is fronted with fine white sand-hills, which at night are very conspicuous.

The Kutch Hills, the Lunkhi range, which are 15 to 20 m. from the sea, stand E. and W. for about 30 m., nearly parallel with the shore-line. At the back of them, and 36 statute miles to the N.E. of Mandavee, stands Bhooj, the chief town in Kutch. These hills, with the exception of Nanao, have no remarkable peaks or features by which they may be recognised. The highest E. hill, called Kattrura, 21 m. to the N. of Moondra, is 1,000 ft. above the sea, of a round form, and may be seen from off the Halar coast, that is, the S. side of the Gulf, in clear weather.

Nanao Hill, 22 m. N. of Mandavee, is of round form, 1,280 ft. above sea, and seen in clear weather 40, sometimes 50 m. off, and even, occasionally, when Dwarka Temple is also in sight.

In the N.E. monsoon, a vessel, working into this Gulf, will keep along the N. shore; and, going out of the Gulf with W. winds, should work to windward along the S. coast, taking advantage of the sheltered anchorages on the E. sides of the several reefs.

ASSAR PAGODA, or Tomb, about 23 m. N.N.E. of Sainia Island, and 7 m. W. of Mandavee, may be called the N. boundary of the Gulf; and it is in the direct line between Sainia Island, the S. boundary of the Gulf, and Nanao Hill in Kutch, the principal land-mark in that province. Assar is a Mahomedan tomb, situated on the crest of the sand-hills close to the sea; its dome is at an elevation of 113 ft., and may be seen 12 m. off. To the S.W. of this place, rocky ground extends 3 m. with overfalls from 9 to 3 fathoms; and it should not be approached within $3\frac{1}{2}$ m.; the Mandavee Light should not be brought to bear to the S. of E. by N.

Mir Tamasha, another tomb, stands midway from Assar to Mandavee, and is 100 ft. above the sea; the little creek to the E. abruptly terminates the high sand-hill of Mir Tamasha, thus forming a steep sandy bluff, which on moonlight nights is seen as soon as Mandavee Light.

Vessels bound to Mandavee should make this coast with Nanao Hill in a line with or to the left of Assar, bearing about N.N.E., that being the mark for clearing the W. end of Ranwara shoals, which have patches of 3 and 5 fathoms rocky ground, at the distance of 6 and 7 m. to the S. of Assar. Mandavee Light may be steered for when bearing E.N.E., but should be kept on the port bow, as the anchorage for large ships is $2\frac{1}{2}$ m. S. of it.

Ranwara Shoal. From the shoalest part of the Ranwara the light-house bears from N. to N. by E., and is $7\frac{1}{2}$ m. off. This patch, on which are always heavy breakers, is about $1\frac{1}{2}$ m. long, E. and W., and about $\frac{1}{2}$ m. broad; the bottom sand, shells, and rock; and least water 2 ft. The foul ground of the Ranwara covers an extent of 10 m., from E. to W., and no ship should approach Mandavee from seaward when the light bears between N.E. by E., and N. by W., until she is inside the Ranwara. In the daytime, the tomb called Rawul Peer, 2 m. E. of Mandavee Fort, when *on with* Nanao Hill, is a safe mark for clearing the E. end of Ranwara shoals.

KUTCH MANDAVEE, in lat. $22^{\circ} 49'$ N., lon. $69^{\circ} 20'$ E., the most important commercial town in the Gulf,* situated nearly $3\frac{1}{2}$ m. to the E. of Mir Tamasha, is a large walled town, of nearly square form, flanked with bastions, and was in its day a strong place. The S.W. bastion is highest, and on it the light-house is built, about 20 ft. above the parapet, and 83 ft. above H.W. mark. The Rao's palace (no longer used as such, but considerably given up by His Highness the Rao, as a rest-house for British officers and their families), a large flat-roofed building, and a more conspicuous land-mark than the light-house, stands about 100 yards to the E. of it. The sea-gate is near the S.E. angle of the fort, from which the narrow channel of the creek (which skirts the E. side of the town, affording a passage for small boats only at H. W., is distant rather more than a cable's length.

To the E. and to N. of the town the creek runs inland, but it is merely the bed of a water-course, with a standing pool here and there, except during the periodical rains and the night spring tides of the fine season. The creek's mouth is obstructed by sand-banks, which change with the

* See Chart: Gulf of Kutch, by A. D. Taylor, No. 43; scale, m = 0.4 of an inch.

least change of wind and consequent swell; although nearly dry at L. W. small boats can enter soon after the flood has made, and coasting craft of moderate burthen soon after half-flood. Freshets from the interior during the rainy season have an excellent scouring effect upon the fair channel of Mandavee Creek, but the first subsequent sea-breeze spreads the choking sand-banks again.

Trade. Mandavee is a very opulent and busy port; its merchants trade by land and river with Marwar, Sind, Katiawar, &c.; and by sea with Bombay and nearly all ports of western Hindostan, Persian Gulf, Maskat, the Red Sea, Gulf of Aden, and east coast of Africa (principally Berbereh and Zanzibar), and sometimes, but rarely the Mozambique Channel. From Bombay are imported the usual European goods and refreshments consumed by the British troops in Kutch, and a large quantity of English thread, with which the Mandavee cloth (rather famed for its quality), is woven. The imports from Africa are ivory, rhinoceros hides and horns, cocoa-nuts, and betel-nuts; a gum called *chund-roz* used in dyeing and varnishing; at times, seeds, as joari, mung, and til; gold in dust and ingots, dollars and venetians. Of late years also a cheap, coarse and strong *American* cotton cloth (hence called *mirikani* by the Kutchees), has been much imported, obtained from American vessels at Zanzibar, and highly prized for its durability as wearing apparel by the natives of Kutch. The exports from Mandavee consist of cotton, cotton cloths (all woven as above with English thread), and brass in wire and rods.

The cloth yard-measure used is the *guz*, of a trifle over 33½ English inches, and there are 24 *tasu* to one *guz*. The current coin of Kutch is the *kuri* or *coori*, 404 of which (as established by the British Government), go to 100 Bombay rupees; this exchange, however, is not recognised by the native merchants, by whom the trade is calculated in dollars (*reals*), and venetians (either *mugrabi* or *sitrani*). British authority in Kutch is represented by the Political Agent or Resident at Bhooj, who has also a marine residence by Siria Village on the east of Mandavee Creek, where a flag-staff will be seen.

People. The population of Mandavee comprises Banians and Bhatias; bound by their religion not to take the life of the smallest creature; they pay a tax to the Rao, in consideration of which their feelings are respected, and peacocks and pigeons (so numerous in and around the towns) are forbidden to be killed. The crews of the fleet of boats which trade with Africa and Arabia are sometimes Musselmin, but principally Hindoos. As sailors they are bold and skilful, the Rajputs notably so; their *mualims* (the pilots of Kutch) are a race deservedly famous for skill and daring; many of them have quadrants and nautical tables, and can determine the latitude by sun and pole-star, and their longitude by dead reckoning.

Some of the Kutch boats (called *Kotiyeh*) are large, well built and decked, and carry a pair or two of carronades. They sail for Africa about the beginning of Oct., and return just before or with the S.W. monsoon. The late arrivals, finding generally too much swell in Mandavee Roads, and surf on the bar, have to run over to the sheltered anchorage at Chanka (see page 347), and despatching much of their cargoes by small boats to Mandavee, when lightened take advantage of the first lull of the monsoon (for which they have to wait only a few days), and come bumping over the bar into Mandavee Creek at H. W.

Mandavee Creek. Boats, drawing more than 9 ft. water, can seldom enter Mandavee Creek at the most favourable season (Oct. to Feb.), when the rains from the hilly country have scoured out a deep channel. With the W. winds, after Feb., the entrance begins to get choked up with sand; until, in May, a boat drawing 7 or 8 ft. has to bump over the bar to get into the creek; and, in the latter part of May and beginning of June, frequently a dozen vessels are rendered useless by this operation, and as many more have to undergo a thorough repair. These boats coming from Bombay and distant parts, knowing that it is about H. W., never give a thought as to the depth of water; but, running in carelessly, take the ground, and bump till the receding tide leaves them high and dry, when their goods are landed in carts; and the vessel, being lightened, floats in at next high tide.

LIGHT. Mandavee Light-house, on the S.W. bastion of the fort, in lat. 22° 49½' N., lon. 69° 20' E., shows a small *fixed* light, at 83 ft. above H. W., but its light cannot be seen at a greater distance than 9 or 10 m., except in very clear weather.

Tides. It is H. W. on F. and C. of moon, at Mandavee at 0 h. 15 m. This time is sometimes retarded several minutes during W., and accelerated during E. winds. The rise and fall is, at ordinary springs, 15 ft., and sometimes at high springs 17 ft. At neaps it is 9 or 10 ft.

In navigating the Gulf of Kutch, vessels should always make allowance for the tides, which run 4 or 5 m. an hour at springs, and 3 at neaps, E. and W., between Chinri reef to the S., and Ranwara Shoals to the N. All across the mouth of the Gulf the bottom is very uneven, and the rapid tides cause a very confused breaking sea, even in a depth of 30 fathoms.

The tides at the anchorage off Mandavee, in 8 to 5 fathoms water, run at the rate of 3 knots

an hour on the springs, and at neaps less than 2 knots; further out from the shore they increase in strength, and, on the Ranwara Shoal, attain a velocity of 5 knots on the springs, and 3 at neaps. This strength of tide is maintained between that shoal and the reefs of Chanka, Noru, and Bida, to the S., and cause a heavy deceiving break, in many places, where deep and shallow water are contiguous. Between Mandavee and Tamasha the soundings gradually increase off shore to about 10 fathoms at 4 m. distance; outside of that, and to the W. towards Assar, and a little beyond it, there are overfalls from 5 to 10, and in some places to 20 fathoms. The tides, running with great velocity over these rocky patches, cause a heavy rippling and break, which is very deceiving to a stranger.

Anchorage. There is good anchorage for ships, in 3 to 5 fathoms at L. W., clay bottom, from $1\frac{1}{2}$ to $2\frac{1}{2}$ m. due S. of the fort; and nearer the shore for small steamers, in 2 fathoms, sand and mud, with the light-house N. by W., and the Political Agent's flag-staff (on the E. side of the creek, to the right of the large banyan tree), bearing N.E. by N. There is a shoal rocky patch bearing S.W. $\frac{1}{2}$ S. rather more than 2 m. from the light-house, having 11 ft. only at low springs.

RAWUL PIR is a white tomb, 70 ft. above the sea, in a clump of trees on sand-hills, $2\frac{1}{2}$ m. E.S.E. from Mandavee Fort. This tomb on with Nanao Hill clears the E. end of the Ranwara Shoals. Between Rawul Pir and Mandavee Fort, by the village of Sernaia, stands the marine residence of the Political Agent in Kutch, with a flag-staff in front. **Modwa Point** is 8 m. E. of Mandavee; the intermediate shore is fronted with sand-hills, 30 and 40 ft. high. The point itself is a high sand-bluff, and off it there is a ledge of rocks dry at L. W. which are deep-to, having 3 and 4 fathoms close to them. Inside the point is an extensive backwater, which runs back to within 2 m. of Rawul Pir, but is only entirely flooded at very high spring tides, and at H. W. in the S.W. monsoon. Behind Modwa Point there is excellent shelter for small vessels hauled up in the S.W. monsoon, preferable to Mandavee Creek, as there is a depth of more than 2 fathoms on the bar at H. W. springs, and it is protected from W. winds. The ledge of rocks before mentioned extends nearly a mile to the E. of these. To the S.W. of the bluff, the sand dries out for nearly a mile from the shore when the tide is out.

The coast-line to the E. of Modwa recedes from the low water-line from 2 to 3 m., but there are long thin strips of sand, from 5 to 10 ft. above H. W. mark, fronting the sea, which are from $\frac{1}{2}$ m. to 1 m. distant from the sea at L. W.; between these and the main land is an extensive swamp, covered with mangroves, and intersected with numerous small creeks, where boats go to cut fire-wood.

NAVINAR, or NAWINAR POINT, 20 m. E. of Mandavee, consists of two or three thin strips of sand, the highest part of which is not 10 ft. above H. W. mark. The main land here recedes 4 m. from the point, and the intermediate space is a vast swamp, covered in places with mangrove bushes, through which runs up the Nawinar Creek, and many other small ones. Nawinar Point is deep-to, having 11 and 12 fathoms S. of it, less than $\frac{1}{2}$ m. off. To the E. of Nawinar Point there is shelter for a few small vessels during W. winds, in 2 to 3 fathoms, with the Point W.S.W., out of the strength of the tide.

Sonar Durri Shoal, a sand-bank between Modwa and Nawinar, consists of detached sands, which are dry at L. W., with deep water between them. The W. ones are $4\frac{1}{2}$ m. E.S.E. of Modwa Point, and the E. ones $6\frac{1}{2}$ m. W. by S. of Nawinar Point. The S. sides of these banks are deep-to, having 12 fathoms at 2 or 3 cables off. A vessel ought not to shoal under 15 fathoms here. During the first half flood, and after half ebb, the shoals may be distinguished by the rippling of the water. And indeed they may always be distinguished from the mast-head by the discoloured water on them. These shoals bear E.S.E., and are 12 m. distant from the anchorage in Mandavee Roads; they extend fully 8 m. off the nearest shore.

Moondra Creek mouth (between mangrove bushes) bears N.N.E. 3 m. from Nawinar Point, and it runs up to a bunder-house N.N.W. for little more than 1 m. The house is perfectly isolated at H. W. springs, the tide flowing a mile to the N. of it. There is no constructed road from the bunder to the town, and the mud left by the receding tide renders it a matter of great difficulty for carts to carry goods to and from Moondra. The bunder-house is $3\frac{1}{2}$ m. N. by E. of Nawinar Point.

Moondra Fort, situated N. of the bunder-house $2\frac{1}{2}$ m., has a white mosque, distinguishable a good way off, and a grove of high cocoa-nut trees $\frac{1}{2}$ m. to the W. of it.

Moondra Shoals. At 3 m. to E. of Nawinar Point there is the S.W. end of a 2-fathom bank, lying N.E. and S.W., $2\frac{1}{2}$ m. long and 3 or 4 cables broad; and N.E. of this again there is a 3-fathom bank, 2 m. long, lying N.N.E. Between the S. end of the former shoal and the shore L. W. mark (which is here 4 m. from the main land) there is a small patch having only 7 ft. on it. On account of these banks off Moondra, a vessel should not shoal under 10 fathoms in going to the E., till Budresir Temple bears N.N.E., when she may stand in to 5 fathoms, bottom all mud.

The coast from Moondra to the Nukti or Toona Creek entrance, is nearly straight, about E. by N. $\frac{1}{2}$ N., and the mud dries to nearly 4 m. off the shore by Moondra, and 2 m. off towards Toona. The soundings are very regular, and bottom mud. All along the Kutch coast water-courses empty themselves into the sea during the rains, and the whole coast from Modwa to Toona is very low, with cocoa-nut trees by all the towns W. of Budresir Temple, which is 11 m. E.N.E. of Moondra, and has a small white dome which points it out very well, and may be seen 9 or 10 m. from a vessel's deck. There is a grove of trees $1\frac{1}{2}$ m. S. of the temple, and Budresir Fort is a little W. of it. Toona Fort stands some distance inland, about a dozen miles E.N.E. from Budresir Fort; the intermediate shore is quite low and sandy, with two or three little villages.

NUKTI CREEK, called also **Toona Creek**, as one branch of it leads up to Toona Bunder, is 13 m. E. of Budresir; its W. point is very low, covered with mangrove bushes, and nearly overflowed at H. W. The only object that marks the entrance of Nukti Creek is a mud island, covered with trees, 15 and 20 ft. high, called **Tekra** by the natives: it is about $\frac{1}{2}$ m. long, N.W. and S.E., and about a mile to the N. of Toona sandy point, from which Toona Bunder bears about N.W., distant 4 m. Pilots are required to take small vessels up to the Bunder.

Toona Tekra trees are in lat. $22^{\circ} 56'$ N., lon. $70^{\circ} 7'$ E., and about 20 ft. above H.W. level.

Boats bound from Mandavee to Juria on the opposite side of the gulf, in the N.E. monsoon, run along shore and sight the Tekra before they branch off to the S. Juria Bunder bears about S.S.E. $\frac{1}{2}$ E. distant $15\frac{1}{2}$ m. from Tekra.

Toona Bunder lies 4 m. N.W. from Tekra; and, though it is the sea-port of the large town of **Anjar**, is an insignificant place: with difficulty can boats of 50 tons burden get there at high spring-tides, as it is up a small creek, not 30 yards wide, branching away from the Nukti. The creek, but for posts that are erected on each side of its entrance, would not be discernible. The flood-tide rushes by the small mouth of this creek to the N. with a velocity of 4 m. an hour. A pilot of the place would be required to take the vessel in.

The Runn of Kutch. In the N.E. monsoon, from Nov. to Feb., the Runn is dry, and traversable by men and camels; but the fine sand of the surface, agitated by the N.E. winds, blinds the traveller. In the Westerly monsoon, the sea water is propelled by the wind many miles to the E., and the Runn is then a great inland sea, and quite impassable for travellers. This vast sheet of water, in the vicinity of the three large creeks which drain it (the **Nukti**, the **Kundlo**, and the **Hanstul**) is subject to the regular tides, but the rise and fall is not of any extent, though the Hanstul, from the great height of the internal waters, attains a velocity of 6 to 7 m. an hour at its mouth in ebbing. When, in Jan., 1852, the rise and fall of the gulf water off the mouth of the creeks was 15 ft., it was only 5 or 6 ft. to the S. of Jinghi, some 15 m. from Hanstul mouth: this difference of level of course renders the ebb tide, in the Hanstul deep channel, to be of longer duration, and the flood shorter, or respectively about 8 and 4 hours.

The HALAR COAST, or **N. coast of Katiawar**. The entire S. side of the Gulf of Kutch is under a different sovereign, the Jam of Nowa-Nugga, whose territory commences with all the banks and creeks which lie S. and E. of the Hanstul. The Halar coast has no high land; but the Birda Hills, in the interior of Katiawar, are sometimes visible from this S. side of the gulf in clear weather. Between the Hanstul and Juria there is a little rocky island on the Runn, called **Bora-ka-thul**, about a mile from the ordinary H. W. mark. It is covered with the cactus and other bushes, and fresh water may be obtained on it by digging.

Mungra Reef, to the N.W. of Juria, has its W. end at the distance of 8 m. from the fort, and its E. end $6\frac{1}{2}$ m. From it the mouth of the Hanstul bears N.E. by N. nearly 10 m., and the mud uncovers at L. W. out to a line between them. The E. end of Mungra Reef bears S.E. $\frac{1}{4}$ S. about 12 m. from Toona Tekra. The W. end of the reef is deep-to, having 5 and 6 fathoms close to it. And at $\frac{1}{2}$ m. from this W. extreme there is a heap of sand and shells, which is the first part that dries (then showing distinctly the position of the reef,) and it lies with the N.W. bastion of Juria and Durbar House in a line nearly. The breadth of the Mungra Reef is one mile at the W. end, and $1\frac{1}{2}$ m. at the E.; there is a deep channel along the S. side of it, and a vessel may anchor and be sheltered from strong N.E. winds, with the sand-heap bearing from N. to N.N.E. 2 m. off, in 3 fathoms, at L. W., muddy bottom, with Juria Fort E.S.E.

JURIA FORT bears S.E. by S. 21 m. from Toona Fort. The N.W. bastion, which is about 80 ft. above sea, and the Durbar House (300 yards S.E. of the former) are high and conspicuous. And outside the fort, nearly a mile to the S., there is a grove of high trees. These three marks point out the place unmistakably, and may be seen in clear weather 10 to 12 m. off from a vessel's deck. Juria N.W. point is of low sand, and bears W.N.W. $8\frac{1}{2}$ m. from the fort; the bunder is more than 2 m. to the N.W. of the fort, and $1\frac{1}{2}$ m. to E. of the N.W. sandy point.

Juria Bunder House is N.W. $\frac{1}{2}$ N. $2\frac{1}{2}$ m. from the fort, and the entrance of the creek

(amongst mangroves) is with this house 1 m. distant on with Juria trees. Boats coming from Mandavee to Juria keep along the Kutch coast, and sight the Toona Tekra before they slant off to Juria, and run round the E. end of Mungra Reef, with the bunder-house bearing S. into Juria Creek, but this cannot be done till after half-flood, by boats drawing upwards of 7 ft. water.

Tides. It is H. W. on F. and C. of moon at Juria Bunder at 2 h.; rise and fall of tide is 16 ft. at ordinary springs, and 9 or 10 at neaps; but 18 or 19 ft. at highest springs.

BALACHERI is a small village, bearing S.W. from Juria Fort $7\frac{1}{2}$ m.; there is, at the distance of $\frac{1}{2}$ m. to the N.W. of the village a small, round, conical hill, detached from the main, and insulated at H. W.; on the top of which is a Mahomedan Fakir's place, called Aku Peer, and $\frac{1}{2}$ m. S.W. of this, on the W. of the village, is a range of rocky mounds, 60 to 80 ft. high, fronting the sea; they extend over $\frac{1}{2}$ m. of ground N. and S., and constitute the sanatorium of the English residents from Rajkote; when tents are pitched there, they make an excellent land-mark. These tent-hills are insulated at H. W. springs. Between these hillocks and Aku Peer there is a small creek, off the mouth of which is a large rock, dry at half-tide, and the mud and rocks dry at L. W. $1\frac{1}{2}$ m. to the W. At the back of Balacheri there is a range of hills about 100 ft. high, which terminate rather abruptly to the S., at $1\frac{1}{2}$ m. to the S.E. of the village.

Shoal water extends for more than 5 m. to the W. of Balacheri, and the place is only approachable towards H. W., and with a native pilot. The shore between it and Nowa Nugga is fringed with mud and coral banks, and no vessel should go near it.

NOWA-NUGGA, or **Jam-Nugga**, the largest and best fort in the gulf, 18 m. to the S.W. of Juria, is the capital of the independent principality, Halar, which is ruled by the Jam of Nowa-Nugga. British authority is represented along the S. side of the Gulf of Kutch by the Political Agent in Katiawar, whose head-quarters are at Rajkote, 50 m. to the S.E. of Nowa-Nugga. The fort is more than 7 m. to S. by E. of the anchorage off Nowa-Nugga. The Kota is a high, circular, turreted building on the W. side of the fort, 182 ft. above the mean sea level, and, from its whiteness, may be seen in clear days, when the refraction is great, at 20 m. distance, and commonly at 15 m. Rather more than $\frac{1}{2}$ m. to the E. of it stands the Durbar House, a large building with a gable roof at either end, and $\frac{1}{2}$ m. to the N.W. outside the fort, is a look-out tower; all three are conspicuous objects. **Nowa Nugga kota** is in lat. $22^{\circ} 27' N.$, lon. $70^{\circ} 3' E.$

Bayday, a little village and fort, where stands the bunder, or sea-port of Nowa-Nugga, is $2\frac{1}{2}$ m. N.W. of the great fort. Boats can come up the creek to within $\frac{1}{2}$ m. of this little fort. The mouth of Bayday Creek is about 2 m. from the anchorage off Nowa-Nugga, and nearly 1 m. to the N.W. of Roji Temple; its W. side is rocky, and the E. side soft mud. **Roji**, a little Hindoo temple with a flag-staff, stands midway between the anchorage and Bayday Fort.

Tides. H. W. at Roji, at F. and C. of moon, at 1 h. 40 m.; rise and fall at high springs 18 ft., at ordinary springs 16, and at neaps 10 ft.

Anchorage. The anchorage off Nowa-Nugga is with Peritan Island just seen outside of the large mangrove island between it and Roji, and with Roji Temple bearing S. by W., or both the towers of Nowa-Nugga open to the left, or E., of all Roji land, in 2 or 3 fathoms at L. W., well sheltered from the W. winds, which prevail from Feb. to Oct., inclusive. The bottom is such very soft mud, that a vessel can safely anchor in her own draught of water; the entrance of the creek will bear from this anchorage S.W. by S. West of this anchorage $\frac{1}{2}$ m. there is a small detached reef, dry at L. W., having a passage between it and the main reef. And $1\frac{1}{2}$ m. N. by W. of the anchorage, there lies a 2-fathoms rocky patch. The Durbar House, touching the E. extreme of all Roji land, is on the line of both these shoals.

Directions. In coming from the W., a vessel passing 1 m. to N. of the Peritan Reef, must stand on E., till all the high towers of Nowa-Nugga are seen (*from aloft*.) to the left or E., of all Roji rocky land; this is to avoid a 2-fathom patch lying 5 m. E. of Peritan.

In coming from the N.E., Bayday Fort should not be opened to the left of, or E. of all Roji land; for, on this bearing and all E. of it, the ground is rocky at the distance of $1\frac{1}{2}$ m. E. of the above-mentioned anchorage; so that, Roji Temple bearing from S. $\frac{1}{2}$ W. to S.S.W. $\frac{1}{2}$ W., are the limits between which to anchor.

PERITAN TREES. Extending a long way to the N. and W. of the entrance of Bayday Creek, there is a mangrove swamp, with a sand-bank on its N.E. face, the N. extreme of which will bear about W. from the anchorage above described. To the W. of this sand, and at the distance of 6 m. N.W. by W. of Roji, there is a detached mangrove island, whose trees are 20 to 30 ft. above H. W., the highest being at the N.E. end. This is called **Peritan**, an excellent land-mark in making this coast, as the trees, like those of the Tekra on the Kutch coast, are not allowed to be cut down.

Soundings. Off the Peritan a vessel ought not to shoal under 20 fathoms, till its high trees

hear to the W. of S. A coral reef, steep-to, and dry at L. W., extends off this island 1 m. to N.E., and $\frac{3}{4}$ m. to S.W.; the W. side of Peritan forms the E. side of the Surmut Kari entrance; and, when the reefs are dry, a vessel may conveniently anchor, to get shelter from N.E. winds, in the mouth of the Surmut, with the Peritan trees bearing N.E. by E., in 5 or 6 fathoms, muddy bottom. **Peritan high trees** are in lat. $22^{\circ} 37' N.$, lon. $69^{\circ} 57' E.$

To the E. of a line from Nowa-Nugga on the S. to the Toona Tekra on the Kutch coast, there was in 1852 at L. W. nowhere more than 10 fathoms water across the gulf, whereas the charts of 1821 represent the head of the gulf as much deeper, and there can be no doubt it is gradually filling up. E. of a line from Peritan to Budresir there is nowhere more than 20 fathoms. Here it may be useful to the navigator (when going direct from Mandavee to Nowa-Nugga,) to know that Peritan bears S.E. by E. about 15 m. from Nowanar Point on the Kutch coast.

The COAST. From Nowa-Nugga to the W. for more than 30 m., the main land of Halar recedes 4 to 6 m. from the sea face of the reefs which bound this coast, and it has no distinguishable objects, with the exception of two or three hills, which are too far off to set as land-marks: but clumps of mangrove trees on the reefs form excellent guides; they are not allowed to be cut down, and are named by the boatmen Peritan, Dera, Nurira, Karumba, and D'huni. Dera differs from the rest of these marks in being a sand-hill, which from a distance looks like a tent, when the sun shines on it. The Birda Hills are frequently visible from this side of the gulf; and, off Roji, they may be seen on a clear day (a distance of 46 m.)

Surmut. S.W. of the Peritan there is the entrance to the Surmut-kari, between reefs, a little more than $\frac{1}{2}$ m. wide; and at the same distance within the entrance there are some rocky patches, which render it unsafe to run far in without a pilot, but a vessel may anchor from $\frac{1}{2}$ m. to $\frac{1}{2}$ m. to S.W. of the Peritan Reef, in 5 fathoms, mud, with the high trees bearing N.E. to E.N.E., and well sheltered against strong N.-Easters. But it will not be prudent to run in there till a couple of hours after H. W., when the edge of the reef will be seen quite dry.

DERA SAND is a range of low sand-hills, 6 m. S.W. of the Peritan. (The name is applied to the coral reef surrounding it, or the whole space included between the Surmut and Seeka Inlets.) The N.W. end of Dera Sand is bluff, about 15 ft. high, and off it are a few scattered, stunted mangroves. To the E. these trees are thicker, and there are two or three single conspicuous trees at the distance of from 1 to $1\frac{1}{2}$ m. E. of the bluff. The reef extends off Dera sand-hill nearly $1\frac{1}{2}$ m. to N.W., and Goos Reef is to the S.W. of it.

Seeka Inlet is 2 m. W.S.W. of Dera, and is navigable for only 4 or 5 m. at L. W.; but at H. W., large boats can pass through channels amongst the mangrove bushes, almost in a direct line to Roji, and thence to Bayday.

NURRIRA is a clump of trees with a sand before it, distant 8 m. about W.S.W. from Dera Sand-bluff. The reef extends off it $1\frac{1}{2}$ m. to N., where the rocks are highest, and 2 m. to N.E. A mangrove swamp joins Nurrira clump with the main land. In the centre of the bay, between it and the Dera, lies the Goos Reef, more than 3 m. long E. and W., and 2 m. broad. At $\frac{1}{2}$ m. from its N. side there is a long sand, that dries before the reef itself, and shows well. On its S. and W. sides are deep-water channels, which, as well as that on its E. side, bear the name of Seeka Kari. These channels are used by native vessels when it is blowing very fresh, they thus avoid the heavy sea outside. The N. edge of Goos Reef is on the line from Dera Bluff to Nurrira.

Soundings. A vessel should not, in working, come under 12 fathoms between Nurrira and Peritan, and not under 15 fathoms when N. of the former, and between it and Karumba. There is nowhere so much as 25 fathoms at L. W. to the E. of a line from Dera, in Katiawar, to Moondra, in Kutch. There are rocky patches, of 7 and 8 fathoms, in the middle of the Gulf, mid-way in the track of vessels from Mandavee to Seraia.

KARUMBA is a mangrove island, 4 m. long E. and W., and a little less N. and S., with a clump of high trees on its N. edge, which bears from Nurrira W. $\frac{3}{4}$ S. 6 m. North of these trees the reef dries $1\frac{1}{2}$ m. off, forming a projecting point, from which the line of reef on the one side trends to S.W. for 4 m., to the entrance of Seraia Kari, and on the other takes a S.E. direction for $2\frac{1}{2}$ m. to another channel that leads round Karumba Island up to Seraia: the mouth of this latter channel is nearly mid-way on the line from Nurrira to Karumba; it is very deep, but narrow, and at 3 m. up is only navigable at H. W. by boats standing over the reefs and the mud-flats. A vessel may run in for $\frac{1}{2}$ m. at L. W., when the reefs are visible, and be well sheltered from W. winds.

The point of rocks N. of Karumba is deep-to, and a vessel should not come under 20 fathoms; but, with the trees bearing S.E., you can come into 15 fathoms, mud; and with them E.S.E. into 7 fathoms. Between the trees of Karumba and those of Chanka Island, there is nowhere to the S. more than 10 fathoms at L. W., except in the mouth of Seraia Creek.

SERAIA INLET, between Karoomba and Dhuni trees, may, at no very remote day, become

the *Liverpool* of Katiawar. Seraia is already an important native port, and its position, as regards the cotton fields of the peninsula, together with the great depth of water in the inlet and the perfect shelter it affords, mark it out as deserving the attention of European merchants. The fact of its belonging to a native chief, who has no one to advise him on maritime matters, hinders the development of trade at Seraia Inlet, which has as great a depth at L. W. as the Mersey of Liverpool can show at H. W. in its entrance. **Seraia-kari** mouth is in lat. $22^{\circ} 28' N.$, lon. $69^{\circ} 32' E.$

The Entrance. From Karumba trees a thin low strip of sand, with mangroves on the sea-side, runs to W.S.W. $2\frac{1}{2}$ m.; its W. end is higher, and has bushes on it, the tops of which are 10 ft. above H. W. mark. The rocks dry a little more than a mile W. of this sand, and a vessel will find excellent shelter in this entrance of Seraia Inlet, or Kari, from N.-Easters, by anchoring 2 or 3 cables' lengths from the reef, in 6 to 10 fathoms, mud, with this nearest point of the sand E. by N., after Karumba trees have just passed behind the N. point of high sand; and with a large banyan tree on with a little conical hill ($11\frac{1}{2}$ m. off.) bearing S.S.E. $\frac{1}{2}$ E. These last are the leading marks into Seraia Creek. Towards L. W. the reefs are well defined, and at any time the mast-head look-out man will discern them, when within 2 or 3 cables' lengths.

Dhuni is a tuft of trees on sand, 6 m. W.S.W. of Karumba, forming the W. point of Seraia-kari, which runs up 9 m. to **Seraia Bunder**, a very small place. The principal town, to which goods are carried by land, is Kambalia, which is 6 m. S.E. of Seraia. The creek is known by both names, Seraia and Kambalia; it has not yet been surveyed on the large scale, and a vessel had better take a pilot at Kutch Mandavee, if bound to Seraia.

CHANKA, or Sahnka (the N. end) in lat. $22^{\circ} 32' N.$, lon. $69^{\circ} 23' E.$, is a little island covered with trees, 9 m. N.W. of Dhuni trees: and from hence to Vomani, the N. point of Okha-mundel, this end of the gulf has nothing but reefs and islands, with good channels amongst them, which are most useful to coasting craft during strong breezes, when there is a heavy swell outside. Chanka is the N.E. of four islands on the Great Bural, or Chanka Reef, the N. face of which is 10 m. in length. The N.E. end of the reef forms in a full semicircle, with a radius of $1\frac{1}{4}$ m. round Chanka Island; after the first quarter-ebb, the rocks at its margin begin to show themselves. Chanka bears about S. by E. from Mandavee.

Bubasir Rock, on which a small post is erected, lying rather less than a mile from the E. edge of the above reef, bears S.E. by E. $2\frac{1}{2}$ m. from Chanka trees.

ANCHORAGE. To the E. and S.E. of Chanka trees, there is good shelter for ships of any size against W. winds, the beacon on Bubasir Rock making navigation easy. A good anchorage is in 5 fathoms, mud, at L. W., about $\frac{1}{4}$ m. S.W. of the rock; but a vessel only taking shelter for a single tide, may anchor to the N. of it in 8 or 9 fathoms, mud, just on the edge of the shoal soundings, with Bubasir Beacon S. by W., and Chanka trees W.

This anchorage on the E. of Chanka in the S.W. monsoon is worth knowing. A vessel disabled between Dwarka and Karachi, and unable to claw off the coast, need not now, with the latest charts on board, have any fear to seek shelter in the Gulf of Kutch. Rain seldom falls hereabouts, and the shore is not so completely hidden as off Bombay. In the day time the towns and trees between Dwarka and Bate Island will be discerned from aloft, and a vessel can run in to N. or S. of Beka Shoal. After passing Chinri Reef, she would be unable, with a S.W. wind, to haul up to S. to clear Hun'man-danda and fetch the anchorage on the E. side of Bate Island, without tacking, therefore we recommend her to run for the sheltered anchorage behind Chanka. To do this, she must stand to the E. along the N. face of Bural Reef. Care should be taken, in approaching this reef at H. W., to keep a good look-out for the trees on Noru and Chanka, which should not be approached nearer than 3 m., till the vessel is off the latter, when she should haul up to the S.E. when Chanka trees bear S., and then the water will soon become smooth, and she may anchor in 8 or 10 fathoms, mud, about one mile to the E. of Bubasir Rock, and 3 or $3\frac{1}{4}$ m. from Chanka, with the trees bearing W.N.W., where the ebb sets to N.W. and the flood to S.E.

Shelter. Large native vessels arriving from the Malabar and African coasts, after the commencement of the S.W. monsoon, seek shelter to leeward of Chanka, and there discharge the bulk of their cargo into smaller boats, which, watching their opportunity, bring the goods over to Mandavee; the larger vessels follow at spring-tides, and boldly run into Kutch Mandavee Creek at H. W. in the daytime, when the tides are highest.

Soundings. Between Bubasir and Dhuni fringing reef (the latter is 5 m. S.E. of the former) the bottom is generally mud, though a few casts of hard ground were found, but the water is not deep. In working to the W., amongst the reefs and islands, the native boatmen usually wait till the falling tide makes the banks apparent. The most minute description of these channels amongst these islands would not be sufficient for the guidance of a large vessel, which should take a native pilot, as the tides are so strong in some places; and an intimate knowledge of their set is

necessary, as the eddies make a vessel unmanageable in light winds. The set of the tide during the first hour of ebb, when it runs out over the reef, is of course very different from the direction it takes after half-ebb, when it is confined within narrow, deep channels.

BURAL REEF, the vast coral reef surrounding the islands of Chanka, Noru, Bida, and Chusra, is completely covered at H. W. of spring-tides, the islands only being then visible. Its N. face is very deep-to, the soundings irregular, from 20 to 36 fathoms, and the tide rushes by with a velocity of 4 to 6 knots. Off its N.E. end the water is shoaler, 15 to 19 fathoms, and beyond this there is a bank, on which are found rocky patches of 7 and 8 fathoms: there is no danger on this bank, which extends more than 10 m. to N.E. of Chanka, although the shoal water and uneven bottom cause heavy rippings and breaks, the rush of tide being so strong.

Noru is a large, low, mangrove island, on the Great Bural Reef, situated $2\frac{1}{2}$ m. to W. of Chanka trees; it is nearly 3 m. in length E. and W.; its N. face is fronted with sand, at the E. end of which are the highest trees, about 25 ft. above H. W. On the N. of Noru, the Bural Reef is deeply indented, and the soundings are mostly mud near the reef in the two angles, where small coasters, when working tide-work with W. winds, can, at L. W., find anchorage, where they wait for the next ebb. Chanka, the N.E. island, is described in the preceding page.

Bida is a mangrove island, nearly 2 m. across; its W. face is fronted with sand, the N. end of which is highest, being nearly 20 ft. above H. W.; it lies 3 m. S.W. of Noru, or about half-way towards Chusra, and about 5 m. to E. by S. of Paga Sand.

Chusra, a small rocky islet, with a clump of trees on its N. end, stands $2\frac{1}{2}$ m. S.W. of Bida, and marks the S. extreme of the Bural Reef, as it is only 3 cables' lengths within the S. point of the rocks. Chusra trees are a most excellent mark for navigating these inner channels.

The N.W. extreme of Bural Reef, which extends nearly 6 m. to the W. of Noru highest trees, and is $7\frac{1}{2}$ m. to N. of Chusra, has the rocks at its edge piled up in three places, which are dry in rather more than one hour after H. W. of spring-tides, and at neaps are scarcely covered at all. The Rao of Kutch (to whom the Bural Reef with its islands are said to belong) promised to erect a beacon on that point, that vessels might avail themselves of the shelter against N.E. winds afforded in a snug anchorage with a depth of 4 or 5 fathoms, muddy bottom, 3 or 4 cables' lengths to the W. of the fringing reef: the bearings for which are as follows:—

ANCHORAGE. Chanka trees (seen from aloft,) just touching the N. sandy face of Noru Island, bearing E.; and Chusra trees bearing S. by E. $\frac{1}{2}$ E. (on with Quoin Hill on the main land, which is 15 m. distant, and only seen above the deck, and in clear weather.) This is a good anchorage, in 4 or 5 fathoms, mud, where no ebb-tide is felt, and very little flood. To the S. of it there are patches of shoal water; and a bank of sand and rock, with overfalls from 5 to 7 fathoms, extends to the W. to Chinri Reef, and S. to the Paga Reef; over this bank the soundings are everywhere alike, ranging between 5 and 10 fathoms; but in the centre there is a deeper gut, having 12 to 15 fathoms; the bearings of the land must then be the sole guide, as the soundings, except when in the centre, will not indicate a vessel's position; and, at spring-tides, the rippings and breaking water frequently alarm a stranger.

Paga, or Turtle Reef, lies 3 m. to the N.W. of Chusra trees, and to the W. of Bida, allowing a passage 1 m. broad between it and Bural Reef. Its greatest length is nearly 4 m., S.E. and N.W. On its W. side is a bank of sand, which is only completely covered at H. W. springs, and forms a good mark; this sand-heap lies 3 m. to the E. of the E. end of Beyt Island. Okhamundel table land S.E. bluff (which is 8 m. S. of Poshetra), seen between the Brothers, or Sahn Islands, is the mark which will keep a vessel clear of the S.E. extreme of the Paga Reef, and will lead in clear to those Islands. The highest peak of the Birda Hills (seen only in clear weather, see page 352), on with, or one degree to the left of the highest part of Ajar Island (seen from aloft) clears the N.E. side of Paga Reef. The N. tip of the reef (which never shows above water), lies $3\frac{1}{2}$ m. to the E. of the Chinri Sands, and bears about W.S.W. from the anchorage described, as available during N.-Easters, at the N.W. extreme of Bural Reef.

Chinri Reef, 2 m. N. of Bate Island, has also a sand-heap only covered at high springs, on its S. side which bears N.W. by W. $\frac{1}{2}$ W., $4\frac{1}{2}$ m. from Paga sand; the reef that dries extends more than 1 m., and shoal water nearly 2 m., to the N. of the sand; the E. extreme of this shoal water bears E.N.E. nearly 2 m. distant from the sand. To the S. of Chinri sand the reef is deep-to, and there is a passage, 1 m. wide, between it and the reef off Bate Island; but between it and Sainia Island, the water is shoal, with overfalls from 3 to 8 fathoms.

BEYT, BET, or BATE ISLAND. The E. end, composed of sand-hills and bushes, 3 m. to the W. of Paga sand, is called Hun'man Point, after a temple of that name, situated about $\frac{1}{2}$ m. within the point. The reef to the N. of this point is called Hun'man-danda, and extends $1\frac{1}{2}$ m. to the N.E. of the sand-hills that border the island's N. side. The island from N.E. to S.W., measures

5 m., but, being a narrow and crooked strip of land, is in its windings half as long again. Its S.W. half is rocky table-land, about 50 or 60 ft. high. Temples in honour of Krishna abound; the population, principally Brahmins, are mainly supported by pilgrims who resort here. When Beyt fort was taken from the Waghers by a British force in 1859, the principal temples were blown up with the fort; before that time the island had 500 houses and 3000 inhabitants.

Beyt Fort Flag-staff is in lat. $22^{\circ} 27\frac{1}{2}'$ N., lon. $69^{\circ} 5'$ E.

Shelter at E. end of Beyt. A vessel, coming in along the S. side of Chinri reef, must pass its sand-heap at one cable's distance, and stand to the E., not letting Aramra Tower disappear behind Bate Island, till Chusra trees just touch the right or S. side of Paga Sand, which bearings will lead her clear of Hun'man-danda; then she may steer to the S.E. with the latter marks on, gradually opening them as she hauls to the S., and as the Kiu Hills begin to appear to the left of the bushes on Hun'man Point, when she may steer for those hills, keeping them just open to the S. of the bushy point, or about S.W. by S. (according to tide, remembering that the ebb will force her to W. against the Hun'man-danda); and then anchor off the E. end of Bate Island, as follows.

Anchorage off the E. end of Bate Island, well sheltered from W. gales, and approached as above, may be had in 5 or 6 fathoms mud, rather more than $\frac{1}{2}$ m. from the shore, with Hun'man Temple N.W. by W. the sandy extremes of Bate Island, from S.W. by W. to N.N.W., (the Chinri sand being just shut out of sight by the latter bearing), where the ebb sets to the N., but the flood is scarcely perceptible. To the E. of this anchorage the bottom is rocky, so it is well to anchor near the island, the water during W. winds being perfectly smooth.

POSHETRA BAY. Between the sandy S.E. side of Bate Island and the main land of Okha-mundel the passage is very shallow, having a bank in mid-channel which is nearly dry at low tide. The water deepens towards the S. extremity of the island, but the many sunken rocks make it unsafe for navigation without a pilot. **Poshetra Point** is nearly 4 m. S.E. of the E. end of Bate, and the town of Poshetra is on high ground nearly 2 m. S.W. of the point; there are two large banyan trees to the N.W. of the town, which are conspicuous objects. There is a sunken reef 1 m. to N. of the point; and, to the E. of it, foul ground for nearly 2 m. A sand-bank on this foul ground, called **Boria**, and only covered towards H. W., marks the E. extreme; but a separate little reef lies to the N. between which and Paga Reef the fair channel is $1\frac{1}{2}$ m. broad. Chusra trees, touching the N. end of Ajar Island, are the leading marks through this passage.

When clear to the N. of these Boria Reefs the Kiu Hills are a little open to N. of Poshetra Point. When clear to the E. of them, the S.E. bluff of Okha-mundel table-land is seen between the Brothers Islands.

The Brothers, called by the natives **Sahn**, are two islands $2\frac{1}{2}$ m. S.E. by S. of Poshetra Point; the W. one is largest, with a flat top, about 60 ft. high; the other is a small conical islet. There is good anchorage $\frac{1}{2}$ m. E. of the Brothers, and also on their W. side, in 6 to 10 fathoms, mud, and sheltered from all winds. Attention has lately been called to this **Poshetra Harbour** as affording deep-water shelter for the largest ships, within $\frac{1}{2}$ m. of the main land of Okha-mundel. This territory belongs to H. H. the Guikwar of Baroda.

MOUTH OF GULF OF KUTCH.

Sainia Island, in lat. $22^{\circ} 29'$ N., lon. $69^{\circ} 4'$ E., bounding the N. side of Bate Inner Harbour, has a sandy spit stretching off 1 m. to the N.W. There is a little tomb called Sainia Pir in the centre of the island, 40 ft. above H.W. level, which is the most useful mark hereabouts, and may be seen 9 or 10 m. from a ship's deck. **Gurur Shoal**, of sand and rock, on which there are various depths of water, from 10 to $3\frac{1}{2}$ fathoms, extends over a length of 10 m. N.E. and S.W., and has a sandy knoll, called **Beka**, just dry at lowest water of spring tides, on the N.E. end, 5 m. from the main land; Bate cocoa-nut trees just to the right of Sainia Pir, bearing S.E. $\frac{1}{2}$ S., mark this little patch which dries at the lowest spring tides.

Soundings. The depth between the Gurur Shoal and the shore reef varies from 12 to 20 fathoms; the bottom is sand and shells. The S. and W. parts of the Gurur are free from danger; but to avoid all risk do not bring Dwarka Temple inside Kutchigud Fort, or to the S. of S. by E. The S. end of Gurur Shoal is connected with the shoal water off Chora sand-hills by a shallow neck, having 10 fathoms water, with much deeper water on either side; but, as these overfalls are so deceiving, ships had better pass to seaward of the Gurur.

Between the Gurur shoal and the main, during a calm, on the ebb tide, the sea sometimes breaks even in deep water; and on both tides there are heavy rippings, causing alarm to a stranger. When standing in towards the Gurur, the change in the colour of the water, the rippings, and great quantities of sea-weed in large patches drifting on the surface, would sufficiently

point it out by day. But the soundings are a sure guide; the 20 fathoms line is decidedly marked; and the water will, when the flood tide accelerates the vessel's speed, generally shoal 10 fathoms at a cast. In W. winds there is a hollow breaking swell on the Gurur.

By night a ship not bound into the Gulf of Kutch, should not shoal under 20 fathoms, off its mouth, as the following bank lies to the N.W. of the Gurur.

LUSHINGTON SHOAL, called **Unnia Mor** by Kutch boatmen, is a shoal patch of sand and rock, the former doubtless brought by the currents from the coasts of Sind and Kutch, and deposited on the rocky nucleus, where the ebb from the Gulf of Kutch, conflicts with the S.E. ocean current of the S.W. monsoon. It is supposed to be getting shoaler gradually; $3\frac{1}{2}$ fathoms at L. W. was the least found in 1850, but there may be a less depth on it. The soundings near it vary, from 15 to 16 fathoms at 2 m. to the S., and from 20 to 30 between it and Gurur, from which it is 11 m. A cast of 5 fathoms was found at 4 m. to the S.W. of Lushington Shoal, in which direction a 10-fathom bank extends 16 m. Shoal patches of 8 fathoms lie to the W. of it; from 10 to 11 fathoms is the depth on its N.W. side, from whence the water gradually shoals to the Kutch coast. To the E., between it and Ranwara Shoal, there is a deep gut with from 30 to 35 fathoms.

The $3\frac{1}{2}$ fathoms patch of the Lushington Shoal, is in lat. $22^{\circ} 37' N.$, and lon. $68^{\circ} 48' E.$ From it Nanao Hill, in Kutch, bears N.E. $\frac{1}{2} N.$, 46 m., and is visible in clear weather; Beka Shoal bears E.S.E. 13 m.; and Dwarka Temple S.S.E. 25 m.

The Tides on Lushington Shoal set E. by N. and W. by S. from $1\frac{1}{2}$ to $2\frac{1}{2}$ knots per hour. H. W. on F. and C. at 11 h. 30 m., when the ordinary rise is 10 ft.

ENTERING THE GULF OF KUTCH. For a steamer, or a ship with a fair wind, bound into the Gulf of Kutch, the passage between the Gurur and the main land of Okha-mundel should be used, care being taken that, in giving that shoal a wide berth, the vessel does not go too near the spit off Sainia; the fair channel is 3 m. wide. From Dwarka the tides make strong in and out of the Gulf of Kutch, setting with the line of coast, 2 to 3 knots per hour, increasing to 3 and 4 as you approach Bate.

Vessels bound to Mandavee from the S., passing between Gurur and Lushington Shoals, should keep Dwarka Temple and Kutchigud Fort in one, or bearing S. by E. so long as either can be seen from aloft on that line. Assar Pagoda, off the Kutch coast, should be steered for, and will bear about N.E. 20 m. distant from outside the Gurur.

Deep Water. To the N. of the Gurur, between Lushington and Ranwara Shoals, there is a gut of small extent, having over 30 fathoms water; from this deep basin, which is a good guide to know a vessel's position, on a fine day Nanao Hill in Kutch may be seen bearing N.E. by N., and all will be clear before you: but due care must be taken to allow for the tides, which set E. and W. in the mouth of the Gulf, about 3 m. per hour. The above bearing of Nanao Hill leads clear in mid-channel between Lushington and Gurur Shoals. A steamer may conveniently pass between the Gurur Shoal and the coast of Okha-mundel, when bound to Mandavee in the daytime, and, by taking a fresh departure from Sainia Island, will not only make more certain of steering straight for Assar Pagoda on the Kutch coast, but will save several miles.

BATE INNER HARBOUR, on the W. side of the fort, is unfit for large ships having so much rocky ground. If wanting to anchor off Bate Fort; after the S. end of Sainia is brought to bear W.N.W. (as at page 351), stand to the S.E., over the flat, for the cocoa-nut trees, when they are on with a large round tree, until the S.W. bluff of Bate Island is just disappearing behind Haji Kurman's Point, when the steamer must be hauled up to the S. and W., and may round the latter point at less than 2 cable's length, and anchor to the S.W. of it, with Bate Fort E.S.E. to E. by S., in 4 or 5 fathoms, rocky bottom. Of course none but a steamer could enter as above, but a small sailing-vessel might work in with a N.E. wind.

Directions for entering Bate Harbour. There are several channels into Bate* at H.W.; but, for steamers, the passage round the E. side of Sainia Island is preferred, as the rocky point of its reef shows itself so plainly, and a vessel should pass quite close to it. There is no flood tide felt in this passage, though N. of it, across its mouth, the flood stream runs 3 or 4 knots to the E., and the ebb to N.W. A sandy spit extends for a mile to the N.W. of Sainia Island. **Beka Shoal**, the N.E. end of the Gurur, which has a little sandy knoll, dry at lowest spring tides, is marked by Sainia tomb just to the left of Bate cocoa-nut trees. Therefore, when the trees are seen clear to the left of all Sainia Island (seen best from aloft) the ship is well clear to the E. of the Gurur Shoal, and should stand onwards to S.E., allowing for tide, if bound into Bate, with those marks a little more open, till Chinr i Sand bears E., when she may gradually open out the whole of Bate Island to the left or E. of Sainia Island.

* See Admiralty Chart, Bate Harbour, by A. D. Taylor, scale m. = 2 inches.

To enter the passage along the E. side of Sainia. Having arrived (as above) within a mile to the N. of the island, keep a look out for the N.E. tip of its reef, and steer for it S.S.W., paying great attention to the tide, which rushes past the tip of the rocks with great velocity. Two sandy points of the Okha shore, between Sainia and Aramra, will be seen in line ahead, keeping these in a line will lead you in clear to the E. of Sainia Reef, which is only partially covered at H.W.; steer S.S.W. along the E. side of the island, not opening out the sandy points till the S. end of Sainia bears W.N.W., when you may go a little further S., and anchor 2 or 3 cables to the E. of the first sandy point, **Okha Point**, in 5 to 7 fathoms, with Vomani Point (see page 354) which is 1 m. to S.W. of Sainia Island, bearing W.

With a W. wind a ship must wait till half flood, and then cross Bate Bar, with the E. sandy point of Okha-mundel on with Bate Fort; in this passage she will have more than 4 fathoms towards H. W.; and, when in the deep water (with Sainia Pir bearing E.), where it breaks even in 10 fathoms when the tide is running to windward, she must borrow towards the S. end of that island, and when up to it, haul to the S. and anchor to the E. of Okha sandy point, with Vomani mound bearing W., as before.

WINDS AND WEATHER IN THE GULF OF KUTCH.

In the Gulf of Kutch W. and S.W. winds prevail from Feb. to Oct. inclusive, and N.-Easters in Nov., Dec., and Jan. In the latter month it occasionally blows fresh, but for never more than two or three days at a time, followed by light winds and calms, or light sea-breezes in the afternoon. The barometer *rises* with these strong N.-Easters, and *falls* before W. sea-breezes.

In the latter end of the month of Jan. and beginning of Feb., dense banks of fog are frequently seen at early dawn on the horizon, after a calm night; when the sun rises, these drift to sea with the land-winds, and are blown back with W. winds, obscuring all objects. They generally come in heavy detached masses, wetting everything, and almost obscuring the sun, which, however, shines out with apparently greater warmth during the intervals. These fogs may be expected until the latter end of February, and are invariably wet. The same prevail on the coast of Sind at that season over the swamps of the River Indus.

From the first week of Feb. fresh breezes, from W. to S.W. may be expected; these are indicated by a slight *fall* in the barometer, and last for two days, succeeded by calms or light winds. And although N.-Easters may still blow occasionally after this date, it is but seldom, and only as a land-wind, in the morning or after midnight; and a slight *rise* of barometer precedes them.

S.W. Monsoon. After the beginning of March the W. winds may be said to have fully set in; and now calms and light N.E. winds are of only occasional occurrence. Towards the vernal equinox, or some time in the second or third week of March, there are one or two days in which thunder and hail-storms happen at the head of the Gulf, in heavy squalls from S.E. to N.E. The barometer gave no warning of these.

In April, W. and W.S.W. winds prevail, being strongest in the afternoon as a sea-breeze, and moderate from midnight till the next forenoon. From the beginning of May the heavy S.W. monsoon's swell has commenced at the entrance of the Gulf, and it becomes a difficult matter to work round the N.W. point of Okha-mundel from Bate to Dwarka, even with the strong ebb tides that prevail in that locality. The swell on the Gurur Shoal is so heavy and confused. Only the larger sort of Kutch Kotiyehs attempt it after mid-May, and they have to lie inside Bate and take advantage of any break in the strength of the wind to try and get out.

From June till end of Aug., the S.W. monsoon blows with more or less strength, sometimes amounting to a fresh gale. Heavy rain seldom occurs before mid-July, and sometimes later, though after the end of June frequent showers happen. After mid-August the most enterprising of the Kutch boatmen leave Mandavee, and lie at Bate, looking out for a break in the weather, which they take advantage of, and make the passage to Bombay in 3 or 4 days. The first arrivals at Mandavee from Bombay after the S.W. monsoon, are in the first week of Sept. After the middle of that month the wind gets considerably weaker, and hauls to about W.N.W. towards midnight. But not until Oct., when they haul more to the N. and become decided land-winds, can a vessel fetch out of the Gulf from Mandavee on one tack without going to Bate.

N.E. Monsoon. In beginning of Nov., the land-winds, or N.-Easters, may be looked for with certainty, and frequently are of moderate strength. After the middle of the month they blow fresh occasionally, sometimes lasting all day; but, when the forenoon is calm, the sea-breeze may be looked for soon after mid-day. The sea-breezes off the Kutch coast are a great relief after the dry land-wind. On the Halar coast the N.-Easters are pleasant.

Gale. On Nov. 21st, 1851, a heavy gale from S.E. and S. was experienced throughout the

Gulf, and many boats were wrecked and foundered. It first commenced as an N.E. fresh breeze at daybreak (during the previous night there were light squalls from all quarters), the barometer was then much the same as the day before, but afterwards fell (instead of rising as usual) towards 10 in the forenoon, by which time the wind had gradually veered to S.E. and become a moderate increasing gale. Rain likewise fell. From 11 h. a.m. to 3 h. p.m. the wind was strongest, blowing a strong S.E. gale at times, in squalls with rain. Towards evening the wind had veered to S.W., and decreased to a strong breeze, but occasionally blowing a moderate gale in squalls. During the night it gradually veered to N.W., at the same time decreasing, and the sky clearing, and at daylight the wind was N., but only a fresh breeze. The barometer was lowest at 2 h. p.m., and after that hour rose rapidly. In the forenoon of the 22nd it was as high as it had been 6 days before.

In Dec. the N.E. winds occasionally blow fresh, but for never more than three or four days at a time. In the afternoon they are very weak, and sometimes there is a calm, or a very light sea-breeze. The E. I. C. sloop *Elphinstone* had a gale in this month, from the S.E. and N.E., when about 120 m. to the W. of the entrance of the Gulf of Kutch.

Passages. During the S.W. monsoon, frequent breaks in the weather occur to enable boats to run between Mandavee and Bate or Seraia, and between Toona and Juria, but these only last a day or two at a time. Large Kutch Kotiyehs, which are late in returning from Zanzibar to Mandavee, stop off the latter place and communicate with owners; then run over to **Chanka** sheltered anchorage, to which place small Kotiyehs are sent to lighten them of their cargo, and bring it across to Mandavee Creek. The large vessel follows at high spring tides, and bumps in over the bar.

From Nov. to Jan. the N.-Easters blow fresh outside the Gulf; and it is prudent for vessels wishing to work into it, to anchor for a few hours off Dwarka, or Kutchigud, should it be ebb tide, and start with the flood across the mouth of the Gulf, to make the Kutch coast, where the water is much smoother. A course of about N. by W., or, with spring tides, perhaps a nearly N. course from Kutchigud Point may thus be made good, leading a vessel nicely between the Gurur and Lushington Shoals towards the Kutch coast, along which she may continue working to the E.; or, if the wind be light, she may anchor to wait for the next flood tide, or till she can make head against the ebb.

KATIAWAR COAST.—BEYT ISLAND TO GULF OF CAMBAY.

(VARIATION, FROM DWARKA TO DIU, ABOUT 1° E).

The W. Coast of Katiawar, from Beyt Island to Diu Head, is 160 m. in length. The N.-most 30 m., called Okha-mundel, under the Gaikwa of Baroda, is almost severed from the main by the Runn, a mud flat, submerged in the rainy season, between Mudhi and the Gulf of Kutch. The 22 m., from the Runn at Mudhi to Miani, form part of Halar, the territory of the Jam of Nowa-nugga, to whom belongs the S. side of the Gulf of Kutch. The S. 10 m. is also under the dominion of the Gaikwar of Baroda. Between M'hul Dwarka and Seel Bunder, 45 m. is under the Nawab of Junaghur. From Mahadeopore to Miani belongs to the Rana of Porbunder. The coast is low, with a sandy ridge fronting the sea. The country is generally well cultivated with cotton, sugar-cane, and various kinds of grain and herbs. The towns and villages are numerous, and many are walled and flanked with round bastions. There are few hills visible along the coast-line. The Katiawar coast is safe throughout its whole length. The currents, if any, set along the line of coast, so that a vessel may run along at any distance; but, at night, a line of about 20 fathoms would be near enough.

The Birda Hills, being from 12 to 18 m. inland, are very conspicuous, and visible from 25 to 30 m. off. When viewed from the N. they are seen in three distinct peaks; the left hand one, called Venu, is highest, being 1,730 ft. above the sea. As you go S. to Porbunder these peaks come together; off Navi Bunder the highest peak is seen on the right hand side of the range. **Junaghur Mountain**, or **Girnar**, 35 m. inland, is of a conical form; its summit, which is notched with two or three small peaks, and thus rendered remarkable, is elevated 3,837 ft. above the sea, and may be seen in clear weather from a distance of 60 m., or all along the coast from Diu Head to Porbunder, until a vessel passes to the N. of the latter place, when it disappears behind the Birda range. It is described as an immense bare and isolated granite rock, presenting all the gigantic masses peculiar to that formation. On it there are numerous temples and monastic establishments of the Jains, which are amongst the most interesting architectural works in India. **The Girh Range**, averaging 1,000 ft. in height, is not visible any distance off the W. coast, though Nandiveli, its E. peak, 1,847 ft. above the sea, is so good a land-mark for the S. coast.

Water is only procurable in any quantity at Verawal, which is also the best port to obtain fire-wood, as it is near the hills, where the wood is cut, and consequently cheaper than elsewhere.

Peninsula of Okha-Mundel. This district (the W. shore of which, from Okha Point to Mudhi, is 30 m. in length) is under the Kamavisdar of Dwarka, who is appointed by the Gaikwa of Baroda. At H. W. of spring tides and in the S.W. monsoon it is very nearly insulated by the submergence of the Runn, a salt marsh that extends from Mudhi a dozen miles to the N.E. into the bay between Pindara and Poshetra, villages on the shores of the Gulf of Kutch. Salt is left on it by the receding tide, which the natives are permitted to collect without any tax. Okha is very low, the substratum being sand-stone; the soil is very poor, and only cultivated around the villages; bajri and til are the only grains that thrive; the agriculturist depends on the monsoon for his supply of water, wells being very scarce. The prickly pear grows profusely all over the peninsula, and, interspersed with the babul or leafless thorn, they form thick jungles, where thieves and outlaws until lately hid themselves. The conch shell, called by the natives *chank*, is found of large size and in great quantities on the shoals along the N. shore and around Beyt Island (hence sometimes styled Chankudhur), and is an article of commerce, as on both Indian and Ceylon shores of the Gulf of Manar.

But for the great temples of Dwarka and Bate, the Okha district would be utterly unimportant. The appearance of the coast from sea, when approaching from the S., is as follows:—sand-hills for 10 m. from Mudhi to Dwarka, cliffs from that place for 7 m. to Kutchigud, then sand-hills for 12 m. to its N. extreme. Besides Beyt Harbour on the W. side of that island, good anchorage is available in deep water with muddy bottom off the E. extreme of the island, and also to the E. of Poshetra (see page 349.) The inhabitants of Okha-mundel are called Wadhel-Rajputs and Waghers; the latter being the people who have so often resisted the local authorities of this province. The origin of these tribes is lost in obscurity; by some they are supposed to be aborigines of the soil. The natives have, for the most part, lived at the expense of the thousands of pilgrims which come from all parts of Hindostan to Dwarka and Beyt; and, till lately, by plunder, both by sea and land. Kutchigud in the fine season, and Beyt and Chanka (Sahnka) in the W. monsoon, were the haunts of the notorious pirates, spoken of formerly as the Sanganians.

The S.E. coast of Katiawar, from Diu Head to Goapnath Point, is generally bold and safe to approach, of moderate height, though rather low in some places. Trees, or the appearance of cultivation, are seldom perceived, being confined to the vicinity of the villages, and it is destitute of an available good harbour where ships could easily enter and ride with safety during a gale of wind. Shalbet Island might be made available as a harbour of refuge, or even as a commercial port, for the S.E. coast of Katiawar. The depths along this coast are nearly equal at different distances from the shore; the soundings, therefore, do not give sufficient warning, nor always denote the distance off. The greatest depths are found off the more prominent capes and rocks; thus, (as in the Gulfs of Cambay and Kutch, where the tides run with such velocity, and scour out deep channels), a deep cast should give warning of the approach to a rocky shoal.

The coast from Shalbet or Chanch to Goapnath Point is of sand-stone. The inland country is undulating, and averages in height about 100 ft. along the sea-shore, but rises towards the interior of Katiawar. To the E. of Shalbet Island there are no remarkable hills seen from sea, except Paulatana mountain, which is 20 m. inland. **The Sea-Coast** presents high perpendicular cliffs, where frequently the rock overhangs, rendering it in many places inaccessible. The cliffs are hollowed into caves, and formed into sharp projecting points, attesting the violence of the S.W. monsoon sea and the friable nature of this sand-stone. The coast is rock-bound, but the bays are mud and sand; it is everywhere safe to approach, from 5 to 9 fathoms being the average depth within 2 cables' lengths of the cliffs. At the back of Jafrabad, the inland country becomes more mountainous at the distance of 10 m. from the sea.

The Girh or Geer Hills commence about 20 m. to N.E. of Diu, and extend over 40 m. of latitude, in which space nearly all the rivers of Katiawar have their source. Captain George Grant, of the Indian Navy, was captured in 1813 by an outlaw Kattee (native of Katiawar), named Bawawalla, who kept him prisoner on the Geer mountains for two and a half months, where he suffered severely from fever. They consist of a succession of ridges and isolated hills, covered with forest trees and jungle, and with a surface extremely rugged; caverns and deep ravines are very numerous; they are the haunt of lions, leopards, wolves, jackals, foxes, wild cats, and wild swine; porcupines also are very numerous.

On the plains to the S. of Gogah, the nil-ghao with deer and antelopes are plentiful, and so are wild fowl in the cool season. Vast bodies of migratory rats sometimes move over the peninsula, none knowing whence they come, nor, on their disappearance, whither they go; they are double the size of the common rat, and their ravages in some years are of alarming extent. These rats so undermine the ground as to make it very dangerous for travellers going across country on horseback. The grains principally cultivated are bajri (millet), joari (maize), and wheat. The

sugar-cane is grown to a considerable extent. Cotton is the principal commercial crop. The soil is not fertile, being in general rather sandy, and requiring much irrigation for the production of crops; but for this there are ample means, as, besides the many streams throughout the country, water is in general close to the surface, and wells are very numerous, especially in the S. part of the country.

VOMANI POINT, the N. extreme of Okha-mundel, in lat. $22^{\circ} 28' N.$, lon. $69^{\circ} 3' E.$, is a little conical mound, elevated about 25 ft. above H. W., and situated 1 m. from the S.W. end of Sainia Island; a shelving coral reef dries off it half-way to the Island. **Okha Point**, which is rather more than 1 m. E. of Vomani, and about $\frac{1}{2}$ m. S. of Sainia Island, forms the W. shore of Bate Inner Harbour, before described. (See page 350.)

Chora Sand-Hills stand along the sea-shore 5 or 6 m. to S.W. of Vomani Point, and the same distance to N.N.E. of Kutchigud Point, and off them the foul ground extends 2 m. Aramra is a fort $7\frac{1}{2}$ m. N.E. by N. from Kutchigud, and standing 2 m. at the back of Chora sand-hills; it is on the S.W. shore of Bate Harbour, and between the two places there is a ferry.

KUTCHIGUD, a small fort at the bottom of a shallow bay, which is open to the N.W., bears from Dwarka about N. by W., $5\frac{1}{2}$ m. The intermediate shore is rocky, fringed with a coral reef, extending about $\frac{1}{2}$ m. off. The soundings are all coral, or hard rock; 10 fathoms is the depth at 1 m. off shore, and 16 to 20 fathoms at 2 m. There is a good landing-place on the sandy beach in the Kutchigud Bay to N. of the fort, protected much by a fringing coral reef to the W.; this beach is frequented by turtle. **Beerwala**, or **Veerwara**, is a large walled town standing between Dwarka and Kutchigud. A square tower in it is a good mark, and visible several miles from seaward. When running up towards Beyt, Beerwala Tower must not be seen to the W. or to right of Dwarka Temple. Kutchigud, with a little strip of land round it, belongs to the Rao of Kutch: it was formerly one of the haunts of the notorious pirates, spoken of in old accounts as Sanganians, or Sangadians, who had a fort, which is now in ruins, on the extreme point of land $\frac{1}{2}$ m. W. of Kutchigud Fort. A former Rao of Kutch built Kutchigud Fort to protect the trading-vessels of his own subjects from those pirates.

From Kutchigud the coast trends away N. by E., gradually rounding to N E. by E. towards Bate, with a dangerous rocky reef extending from 2 to $2\frac{1}{2}$ m. off shore; and outside of this, leaving a fair channel 3 to 4 m. wide, lies the Gurur Shoal. (See page 349.)

DWARKA TEMPLE, also called Dwarkanath or Jigat, and Goomti, from the small stream washing its base, is a shrine of very great sanctity, and resorted to by thousands of pilgrims from the most remote parts of India. The structure is of stone, well carved, with figures from base to summit, and white-washed all over, which makes it a very conspicuous land-mark. Its elevation above the sea-level is 168 ft., and it is visible at a distance of 17 or 18 m. in clear weather. A little to the W. of it, close to the edge of the cliffs, a column is erected to commemorate the capture of the place by the British under Colonel the Honourable Lincoln Stanhope on the 26th Nov., 1820. There are several small temples between this column and the fort. The Goomti is merely one of those streams that drain the country in the rainy season; at low tides its mouth is closed, though the sea washes the S. side of the fort at H. W.

Dwarka Temple, in lat. $22^{\circ} 14' N.$, lon. $68^{\circ} 58' E.$, is nearly 1 m. to E. by S. of the point.*

Anchorage. For large vessels the best anchorage is in 11 to 12 fathoms, sand, with Dwarka Temple E.N.E. distant $1\frac{1}{2}$ m., but holding-ground is bad hereabouts, and towards the entrance of the gulf; the surveying-vessels lost several anchors. The flood-tide sets to the N. The landing-place is on the steep sandy beach between the cliffs and the mouth of the Goomti, by an old dark temple washed by the sea at high tide. But with any S. swell there is here too much surf, and boats should then go into Rupon Creek.

Rupon Bunder, the port of Dwarka, $1\frac{1}{2}$ m. to the N. of Dwarka Point, is marked by a square flat-topped house on a sandy neck of land, on the N. side of a creek. The cliffs which commence at Dwarka are about 40 ft. high, covered with cactus bushes, and terminate at Rupon Creek, which is shallow and much obstructed by rocks at the entrance. The small country vessels which visit it lie aground at L. W. on a fine sandy beach where the water is smooth, as the sea breaks on the fringing reef $\frac{1}{2}$ m. to the W. The force which invested Dwarka in Nov., 1859, was conveniently landed here from the steamers and ships.

Tides. It is H. W., on F. and C., at Rupon Bunder at 10 h. 30 m.; high springs rise 11 ft., ordinarily 10 ft.; neaps 6 or 7 ft. Off this place the flood sets to N., sometimes more than 2 m. an hour, and the ebb to S.S.E. about the same strength. As the vessel goes N., the tides increase in velocity, rendering navigation difficult.

* A light-house was proposed for Dwarka Point, by the late Captain Albany Grieve, I.N.

MIANI BUNDER, in lat. $21^{\circ} 50' N.$, lon. $69^{\circ} 21' E.$, bearing N.W. 17 m. from Porbunder, and 33 m. to the S.E. of Dwarka, is a little village with a small fort, on the S. bank of a considerable creek, called Burtu or Vurtu, which has about 9 ft. at H. W. in its mouth. The Pagoda, so called, is an old Hindoo temple, called Hersad Mata, situated on a hill about 180 ft. high on the N. side of Miani Creek. The Creek can only be entered at H. W., the bar and all inside being dry at L. W. Off Miani it is perceptible that the flood-tide sets N. Between Porbunder and Miani the soundings are rocky to 10 and 11 fathoms 2 m. off shore, increasing to 15 fathoms, mud, at 5 m., and 20 fathoms at 10 m. The coast is low, rising gradually to the hills at Miani. Proceeding to the N. the water becomes deeper and the bottom rocky, with mud intermixed; the soundings are 15 fathoms at 2 m. off, 20 about 5 m. off, and 22 at 8 m. off.

The coast from Mudhi to Miani runs S.E. 22 m., forming a high sandy ridge, broken here and there, in gaps; the only remarkable objects being two small conical hills 3 m. to the S.E. of Mudhi Fort, and just half-way between Miani and Dwarka. The shore is throughout a high sandy beach by H. W. mark, but paved with flat rock below that. Mudhi, or Murri, 12 m. S.E. of Dwarka, is a little hamlet with a small dark temple and old tower, standing on an elevated rocky piece of land, on the S. side of the small Runn or swamp which separates Okha-mundel from Katiawar.

PORBUNDER, in lat. $21^{\circ} 37' N.$, lon. $69^{\circ} 35' E.$, the largest town on the coast, and a place of considerable trade, bears S.E. 17 m. from Miani and N.W. from Tunkra Temple $9\frac{1}{2}$ m. The town is within the fort, the walls of which are $1\frac{1}{2}$ m. in circumference. The landing-place is opposite the S.W. bastion, in which is the flag-staff, which hoists the white flag of the town. The Rana of Porbunder possesses the district of Burda, or Jaitwar, the sea-coast of which lies between Mahadeopore and Miani. He is of the Jaitwa tribe of Rajputs, and subordinate to the Gaikwa of Baroda, to whom he pays tribute, as well as to the British Government, which also receives a share of the customs duties of Porbunder, ceded to the late E. I. C. in 1809, for the maintenance of a small military force at Porbunder.

The Birda Hills, from 10 to 18 m. to the N.E. of Porbunder, are visible a long way off, in clear weather 25 m. from the coast. The highest peak is said to be 1,730 ft. above the sea. Junaghur Mountain, or Geernar, 3,837 ft. above the sea, is plainly visible in clear weather from Porbunder, but in going N. a ship loses sight of it as it disappears behind the Birda Hills.

Anchorage. The coasting craft anchor 2 to 3 cables' lengths to the W. of the town, and are a little sheltered from N.W. winds, this boat-anchorage being slightly protected by a rocky spit to the N.W.; but the bottom, inside of 9 fathoms, is more or less rocky, and very bad holding-ground. Large vessels must anchor nearly 2 m. from the fort in 9 fathoms, mud, with flag-staff on with northern Birda Peak. The creek opens at the N.W. angle of the town, in a very narrow rocky mouth, with only $1\frac{1}{2}$ ft. at L. W. springs, deepening to 9 ft. under the walls at the jetty.

Tides. H. W., on F. and C., at 9 h. 45 m.: rise and fall 6 ft. at ordinary springs. The tide in the creek runs from $1\frac{1}{2}$ to 2 knots per hour. In the offing the tides are not perceptible; H. W. occurs here earlier than any other part of the coast; the flood-stream diverges hence to N. and S.

NAVI BUNDER, another walled town, in lat. $21^{\circ} 27' N.$, lon. $69^{\circ} 47' E.$, bears S.E. 15 m. from Porbunder, and is 15 m. N.W. of Mahadeopore, close to the sea, with a good creek formed by the junction of the Bhadar and another small river. It washes the N. wall of the town, and falls into the sea $\frac{1}{2}$ m. to the N.W., but the mouth is shallow and rocky, and difficult of access. This is, however, said to be the largest river on the W. coast of Katiawar.

The coast about Navi consists of sand-hills, with occasionally a little rock on the beach, the surf always heavy. Several villages, known by patches of trees, line the shore. Between Navi Bunder and Porbunder the coast trends N.W. $\frac{1}{2}$ N., fronted with sand-hills, at the back of which is an extensive swamp, extending in the rainy season from the one place to the other, but in the fine season confined to the vicinity of Gosa, a village between Navi and Tunkra, from which it derives its name of Gosa-ka-bara. In the cool season vast numbers of water-fowl are seen on its banks. Tunkra temple, standing $\frac{1}{2}$ m. to the N.W. of a village of that name, is 6 m. N.W. from Navi Bunder. The mouth of that extensive swamp or back-water, during the rains, is about 1 m. to the N. of this temple. This coast is all sandy, with a rocky bank extending $1\frac{1}{2}$ m. off. Outside of that you have 10 fathoms, mud, gradually deepening off into 15 fathoms at 6 m.

MAHADEOPORE, or Madupore, in lat. $21^{\circ} 15' N.$, lon. $69^{\circ} 58' E.$, is a walled town standing close on the beach, about 7 m. to the N.W. of Seel, and 15 m. S.E. from Navi Bunder. The beach is steep and sandy, and landing is difficult on account of surf. This fort or walled town is small and square, with round towers at the corners. Behind Mahadeopore are some curious caves, and high sand-hills to S.E. of it. Here commences the territory of the Rana of Porbunder.

SEEL BUNDER, in lat. $21^{\circ} 11' N.$, lon. $70^{\circ} 2' E.$, about 7 m. to S.E. of Mahadeopore, and $5\frac{1}{2}$ m. to the N.W. of Mangarol, has a good creek, with plenty of water in it for native vessels of any size, but the mouth is only open during rains. On the S. point of the creek is a newly-built square tower on a high sandy mound. The town of Seel is about a mile within the creek, on the S. bank. A single brab-tree rises out of a copse of trees at the village of Merunsa, to the S.E. of Seel New Tower. The natives are extremely desirous of making Seel Creek navigable during the fair season, and undertook some works for that purpose during the year 1853, 1854.

MANGAROL BUNDER, bearing N.W. $\frac{1}{4}$ W. 10 m. from Mandar, and nearly 2 leagues to S.E. of Seel, is another small anchorage for boats, formed by a ledge of flat rock which has been cut away on the inside so as to form a wharf, alongside of which boats lie and take in their cargoes; but it is open to all except N.W. and N.E. winds, and will not admit more than three or four Kotiyehs, or native vessels, at a time. The town of Mangarol is $1\frac{1}{2}$ m. N.E. from the bunder, and is conspicuous from a distance of 10 to 12 m. by a high tower connected with the chief's house. Near this place there is much cultivation and trees, and some fine old Mohamedan tombs amongst banyan trees. The fishermen at the bunder village are Hindoos, but at Mangarol the inhabitants are chiefly Mohamedans. The Nawab of Mangarol is a Mohamedan, tributary to Junaghur.

The N.E. winds off the land, from Nov. to Jan., are a fair wind with very smooth water; and vessels may coast it within 2 m. From Mangarol the line of coast runs N.W. $\frac{1}{4}$ N. to Navi Bunder, a distance of 27 m. The soundings regular, over a muddy bottom, but rocky from 1 to $1\frac{1}{2}$ m. off shore; at 2 m. off, 11 fathoms, mud; at 5 m. off, 14 to 15 fathoms; and 18 to 19 fathoms at 10 m. off.

Tides. About this place the streams of tide are not perceptible. H. W. at the bunder about 10 h. 30 m. at F. and C.; rise and fall 7 ft. at springs, and 3 or 4 ft. at neaps.

Mandar, the bunder of Chorwar, bears N.W. by W. 10 m. from Verawal, and S.E. 10 m. from Mangarol. This is a small anchorage, with an old tower, and modern store-house close to the beach, which is called Choorwar in the old charts, but the town of that name is $1\frac{1}{2}$ m. to the N. of the bunder. A fine stream, called the Kaumba, pours its waters into the sea during the S.W. monsoon, about $\frac{1}{2}$ m. to the E.; but, like most of the rivers on this coast, its mouth is generally dammed up with sand during the fine season, and the water near the sea quite salt.

The coast to E. of Mandar is generally sandy, with low cliffs here and there, and the bottom below L. W. mark very rocky, which renders landing difficult. At 4 m. S.E. of Chorwar is the walled town of Andri, known by its many towers, on which are white flags, amongst thick trees. From Mandar to Sutrapara the coast is quite clear, and safe to within 1 m. of the shore; the bottom is mud, and mud and shells, till you come to the rocky bank which fringes the coast everywhere to the distance of a mile. Between Mandar and Mangarol the landing is difficult, as it is very rocky.

VERAWAL, or **VELAWAL**, formerly **Verrole**, in lat. $20^{\circ} 54' N.$, lon. $70^{\circ} 23' E.$, bearing S.E. by E. 20 m. from Mangarol, and $8\frac{1}{2}$ m. from Sutrapara, is a large and populous town, carrying on a considerable trade with Maskat, Karachi, and Bombay. The boat-anchorage is partially protected from N.W. winds by a rocky spit running off from the outer bastion of the town, but the bottom is rocky inside of 11 fathoms, and does not afford good holding-ground. We understand that the port has been lately improved by English engineering. Water and wood are cheap and plentiful at Verawal: the former being easily obtained from a well on the shore of the sandy bay, just to E. of the town. Rice and good poultry are procurable, but scarcely any sheep, owing to the influence of the Banyas (who wish to preserve animal life) over the villagers.

Somnath Temple. Two m. to E.S.E. of Verawal may be seen the once famed temple of "Somnath," situated close within the sea-wall of the ancient town of Pattan. It is now desecrated and defiled, and is scarcely distinguishable from the mass of ruins which surround it, but still retains some traces of its original beauty. Pattan is surrounded by a wall and the remains of a moat, which in early days used to be filled from the sea. The sea-face of the wall, close within which the remains of the temple of Somnath stand, is in course of demolition by the sea during the S.W. monsoon. Two streams, the Heeran and the Saraswati, conjointly discharge themselves into the sea about $\frac{1}{2}$ m. E. of Pattan; both are held in great sanctity by the Hindoos.

Anchorage. Mid-way between the two towns of Pattan and Verawal stands the modern temple of Veervanjan, with a spire about 60 ft. high, which may be seen 10 to 12 m. off. A good anchorage is with this bearing N.E. by E. about $1\frac{1}{2}$ m. distant, in 11 fathoms, mud.

The coast E. of Verawal is low and sandy for 4 or 5 m., then rises to rocky cliffs of 40 to 60 ft. elevation, within $1\frac{1}{2}$ m. of Sutrapara. At the commencement of the rocks there is a small boat-anchorage and village called Heerakot, once a stronghold of the Guzerat pirates; the ruins of their forts still exist.

SUTRAPARA, in lat. $20^{\circ} 51' N.$, lon. $70^{\circ} 30' E.$, about 3 leagues to S.E. by E. of Verawal, and 11 m. W.N.W. from M'hul Dwarka, is a small bay affording good anchorage for coasting craft, being protected by a spit on either side, and the bunder is a good landing-place for boats. On the N. side of the bay the cliffs are about 50 ft. high, and on its S. side the sand-hills are high. The shore-reef projects a little off the S. point, on which are two large rocks visible a good way off. On the shore of the bay there are the remains of an old fort, and a new house, close by which there is a sulphurous spring of water; about $\frac{1}{2}$ m. inland stands the town of Sutrapara.

The Coast between this and M'hul Dwarka is low and sandy, with patches of cliff. Two tall brab-trees, amongst other trees, mark the site of the village of Daumlej, rather a large town, $\frac{1}{2}$ m. inland; and to the W. of this there is a single conspicuous tree near the coast.

M'HUL DWARKA bears W.N.W. $10\frac{1}{2}$ m. from Diu Head, the intervening coast forming rocky points with sandy bays between, and about mid-way are cliffs of 30 to 40 ft. elevation. M'hul Dwarka, or the original Dwarka, (from a native tradition that the celebrated temple of that name once stood there, but is now submerged in the sea,) is a small bluff point with an old temple on its summit, 78 ft. above the sea-level, and, though scarcely distinguishable from other similar clumps along the coast, may be known by the white sand on the top of the cliffs and the dark building of the temple; there is a single brab-tree a short distance to the N.W. There is a good landing-place for boats on the S.E. side of the headland on which the temple is. About $\frac{1}{2}$ m. E. of M'hul Dwarka the Singora River falls into the sea, but it has very little water in it except during rains. There is a large salt creek, called Somad or Soomat, about $\frac{1}{2}$ m. to the W.N.W.

The Town of Korinar, or Kolar, (of which the above is the bunder) is just visible amongst trees, 3 m. N.E. of M'hul Dwarka; and a white tomb, called Chara, stands close to the sea 2 m. to E.S.E. The village of Chara, to the E. of the tomb, has larger and thicker trees than elsewhere. M'hul Dwarka, and the coast to the E. as far as Diu, is under the dominion of the Gaikwar; but to the W. as far as Seelbunder, under the Nawab of Junaghur.

SHOAL BANK. From $\frac{1}{2}$ m. W. of Diu Head, a rocky shoal, 7 m. long, extends to within $2\frac{1}{2}$ m. of M'hul Dwarka, varying in breadth from $\frac{1}{2}$ m. to $\frac{3}{4}$ m., and distant from the shore 1 to $1\frac{1}{2}$ m. The soundings on it range from 7 to 2 fathoms, all rock, with 10 and 11 fathoms, mud. inside. The least water found on it was 2 fathoms, and no vessel should approach it within 12 fathoms, which is about a mile from the S. edge. The building on Diu Head bearing E. by N. will lead a ship clear to the S. M'hul Dwarka, N. by W. $\frac{1}{2}$ W., clears to the W. of it; and with a remarkable clump of low cocoa-nut trees bearing N., a vessel is clear to the E. of the shoal.

Tides. It is H. W. between Sutrapara and Diu, on F. and C., about $10\frac{1}{2}$ h., with a rise and fall of 7 ft. Ebb sets W.N.W. and flood E.S.E. about 1 to $1\frac{1}{2}$ knots per hour, but subject to irregularities and checks from prevailing currents. In Dec. and Jan., when the current was setting up the coast, the ebb often ran for twelve hours at a time, remaining slack during the time of flood generally, but with a slight set to the E. occasionally.

DIU HEAD, called **MANDWA** by the natives, in lat. $20^{\circ} 41' N.$, lon. $70^{\circ} 51' E.$, is a bluff rocky headland, having an old building on the top of the cape 104 ft. above the sea-level, and forms the S. extremity of the province of Katiawar. The point slopes to the E., terminating in a small rocky islet, and forms a small shallow bay with a creek running up to the village of Vailum, or Velun. The point is quite safe to approach within 1 m., the soundings decreasing very gradually to 12 fathoms at that distance, all mud. The country is generally low, with an extensive salt swamp at the back of Diu Head. The Girh Hills, 25 m. to the N.E. of Diu Head, are conspicuous; Nandiveli, the E. peak, before described, bears from Diu Head N.E. $\frac{1}{2}$ N. 26 m. When rounding Diu Head, navigators frequently mistake Nandiveli for Junaghur Hill, a much higher mountain, 40 m. further to the N.W.

Mandwa Bay gives shelter to small craft from N.W. winds, but boats may in the N.E. monsoon conveniently land in a little bay $1\frac{1}{2}$ m. W. of the building on Diu Head, opposite a clump of palm-trees. N.W. winds are by no means frequent on the Katiawar coast, nor do they cause a heavy surf; but landing is rendered difficult and dangerous when a long heavy ocean-swell occasionally rolls in from the S.; at such times landing even in Mandwa Bay is scarcely practicable.

Entrance. A shoal extends off the point of Diu Head for 3 cables' lengths to the E., leaving a clear passage $\frac{1}{2}$ m. broad, and with soundings from 8 to 6 fathoms between it and the shoal off Monakbara Fort; but a sunken rock lying in the bay must be avoided, which is $\frac{1}{2}$ m. to E.N.E. of Mandwa Point.

Anchorage. Convenient anchorage for coasters in 4 fathoms, water, will be found 3 cables' lengths to the W. of the sunken rock in Mandwa Bay, with the point bearing S.W., and the bungalow at Velum N.W. by N., which bearing of the bungalow will lead a vessel clear into the bay.

Diu Head is steep-to, and may be approached quite close; but, to the E., has the above-

mentioned shoals off Mandwa Bay; and, at $1\frac{1}{2}$ m. to the W. of the building on the head, there is the E. end of a **rocky shoal bank** (already described), 7 m. in length, lying more than 1 m. off shore and having patches of 3 fathoms on it; this shoal should not be approached on the S.W. within a depth of 12 fathoms.

Tides. Mandwa Creek is dry in the entrance at L. W. It is H. W. on F. and C., at 10 h. 45 m.; spring tides rise 7 ft.; neaps, 3 ft. The country at the back of Diu Head is swampy and much overflowed at high spring tides. Off Diu Head the stream of flood frequently runs, at F. and C., till 1 h. 45 m.; or three hours after H. W. on shore. South of the cape the flood sets E., and ebb W. $1\frac{1}{2}$ to 2 knots an hour; but the stream of tide is very irregular, as the ebb from the Gulf of Cambay, and the flood from the W. coast of Katiawar frequently meet here, causing strong eddies a few miles S. of the cape.

DIU, or DIO ISLAND, sometimes written **Dew**, which belongs to the Portuguese, lies off the S. extreme of the coast of Katiawar, from which it is separated by a very narrow channel, through a considerable swamp; and being 7 m. in length E. and W., which is the direction of the coast, it appears to form a part of it. Diu Town stands on the E. end of the Island, the castle being in lat. $20^{\circ} 42' N.$, lon. $70^{\circ} 59' E.$, and 5 m. from Nowa Bunder. Diu Island, which belongs to Portugal, seems to have been the earliest permanent settlement of the Portuguese in India; and, by leave of the native sovereign, they built here a factory, which was fortified in 1534. The island is of irregular outline, about 7 m. in length, E. and W., and from 2 m. to $\frac{1}{2}$ m. in breadth. The S. face of the island is a sand-stone cliff washed by the sea, having deep water close-to. Several groves of cocoa-nut trees are scattered over the Island. The hills are little more than 100 ft. high. **Diu City**, with its numerous churches, monasteries, and buildings, may be seen 10 m. off, and the flag-staff further still; but now Diu is in ruins, though still possessing several good substantial dwelling-houses. The castle is separated from the other fortifications by a deep moat, cut through the solid sand-stone rock, through which the sea had free passage at one time, but at present it only enters at the highest tides. The population is about 8,000, of Hindoos, Parsees, and Indo-Portuguese, with a few Europeans, the latter being in Government employ as soldiers and civilians. Trade is principally carried on with ports in the Mozambique Channel, by half-a-dozen brigs, which make but one voyage during the year, going to the African coast in the fine season, and returning with the S.W. monsoon. The Governor has one grab-brig and a patimar.

Coast of Diu. Besides Diu Town, there are three large villages; one on the W. end, called Monakbara; another, on the N. side of the hills, called Bachawara; and the S. one, Nagwah, having a little fort commanding a small bay. **Nagwah Fort** is $\frac{1}{2}$ m. within the S. point of the above bay, which gives shelter to small vessels from W. winds, and $4\frac{1}{2}$ m. W. of Diu Castle; the sea-face of Nagwah Cliffs is steep-to. **Monakbara Fort**, commanding the W. entrance of the channel round Diu Island, stands 2 m. to the W. of Nagwah Point. This W. entrance has as much water as the other, but many scattered rocky patches lie off it. The outer shoal, which has only 9 ft. at L. W., lies about $1\frac{1}{2}$ m. S.W. by S. from Monakbara Fort, forming the E. danger of Mandwa Bay. Diu Head is 2 m. to the S.W. of Monakbara, and bears from Diu Castle flag-staff W. by S. 4 m.

Goglah is a small village belonging to the Portuguese, on the N. side of Diu Channel, on a narrow tongue of sandy coast, extending from the Nowa Bunder cliffs; to the N. and W. of this place there is nothing but a swamp for some distance. Another little fort on that sandy isthmus protects Goglah and Diu on the land side. The inhabitants of Goglah are a hardy race of sailors, who serve in vessels trading with the Mozambique, and in the batelas and kotiyehs of the Katiawar coast. There are also a few families of Arab descent, who, like those of Gogah, furnished sailors for the Indian navy, and for merchant vessels of Bombay.

Supplies. Diu is a poor place for supplies; no meat, and but few vegetables are procurable; salt fish and rice are plentiful. Poultry only to be obtained at Goglah. Good water is supplied to shipping on application to the Governor. This is preserved in excellent but ancient tanks, cut in the solid rock, which are filled every rainy season. There are pipes leading from these tanks to the castle bunder, where vessels of small size may lie, and fill up their water with great expedition.

DIU HARBOUR is formed on the N.E. side of Diu Island, by the E. cape, which bears from Nowa Bunder Point W. by S. $\frac{1}{4}$ S. 5 m. Diu Fort, or walled town, on this E. cape, has a strong wall, flanked by numerous towers on the N. and W. sides, and protected by steep rocky cliffs on the S. or sea face; and having the castle (on which is the flag-staff) occupying its E. end.

The passage between the island and Goglah Town on the main land affords but a narrow channel, which is throughout navigable by small boats; but abreast of Diu Town it has deeper water, about 15 ft. at low tide, so that any vessel that can enter at H. W. can lie at anchor in the

stream. The least depth in the entrance is 6 ft. at L. W., the rise being 7 ft. at highest springs, and little more than 3 ft. at neaps.

Anchorage. Off the fort point a rocky ledge extends $\frac{1}{2}$ m. to the E.N.E., slightly protecting the river entrance; and, at 3 cables' lengths to the N.E. of that rocky spit, a small vessel may find anchorage in 4 fathoms, mud. But, in getting to that position, when coming from the W., the two following shoals are to be avoided:—

A bank of sand and rock, having 6 ft. water, which lies about 3 or 4 cables' lengths E. by S. from the tip of the above rocky spit, or $\frac{1}{2}$ m. to the E. of the castle flag-staff. The other bank, also of rock and sand, lies nearly $\frac{1}{2}$ m. E.N.E. of the first bank, and is 3 cables' lengths long, E. and W. **The Channel**, between the spit and the first bank, has 4 fathoms in its centre; that between the two banks has 4 to 6 fathoms. The soundings in the bay are not regular, nor is the bottom good holding-ground, being principally sand, with here and there a patch of mud, but in some places rocky. Vessels should avoid being caught in the bay with a strong E. wind.

Tides. It is H. W., on F. and C., at 11 h.: high springs rise 7 ft.; ordinary springs, 6 ft.; neaps, 3 ft. The flood-stream outside of Diu sets E. by N.; greatest velocity at springs $1\frac{1}{2}$ knots, and it often runs 2 hours after H. W. by the shore. Ebb sets W. by S., 2 knots at springs, and often runs $2\frac{1}{2}$ hours after the water along the shore begins to rise. These irregularities of tides will account in some measure for the eddy currents off Diu Head. In the end of Jan. 1836, during two and three days before full moon, the stream, in the offing between Nowa Bunder and Diu ran to the W., at the rate of less than 1 knot, for eighteen hours consecutively; and the flood was during those two days scarcely perceptible. These facts will account for conflicting statements regarding the real time of H. W. at Diu.

NOWA BUNDER is a small town on the right bank of a creek, available for coasters towards H. W., and partially sheltered from W. winds. Nowa Bunder, formerly a nest of pirates, belongs to the Nawab of Junaghur. Some conspicuous brab trees stand 2 m. N.N.W. of the Nowa Bunder Cape, and the town of Daliwala, with a large temple, is $1\frac{1}{2}$ m. W. of them. The cape is high, bold, and steep-to on its sea-face, which is 2 m. long, but a bank of shoal water extends from it $\frac{1}{2}$ m. to the E. The Mohamedan seamen of this place and Goglah are descendants of Maskat Arabs, who originally settled at Diu; so are also the Lascars of Gogah. They are known to be the best and boldest sailors of Hindostan.

Semah Fort, about 10 m. from Diu, also belongs to the Portuguese; so does **Bainsla Islet**, which lies off it to the E. about $1\frac{1}{2}$ m., apparently connected by a reef of sunken rocks. A creek runs up to Semah Village, belonging to the Nawab of Junaghur, and $1\frac{1}{2}$ m. to N. of the fort. Radjpoor is $2\frac{1}{2}$ m. to N.E. of Bainsla Islet; there is deep water to the N. of the islet.

JAFRABAD, in lat. $20^{\circ} 52' N.$, lon. $71^{\circ} 23\frac{1}{2}' E.$, 24 m. to E.N.E. of Diu, and $7\frac{1}{2}$ m. to the W.S.W. of Shalbet Island, has the best river on the coast, there being no bar, and the entrance easy; although shoal, vessels will receive no damage by lying in the soft mud at L. W., as they are well sheltered. The town is about a mile up the river, surrounded by a wall; next to Diu, it is the most considerable place for trade on the S. coast of Katiawar. This port affords no shelter for large vessels, though convenient for small coasters, which can get into the river and up to the town, which is nearly 2 m. from the point forming the W. side of the bay. Small craft can lie on the N. part of that point, in the mud, at L. W. Large vessels must lie outside in 7 or 8 fathoms, $\frac{1}{2}$ m. E. of the point.

Jafrabad, which is a walled town, more than a mile within the river, has several towers, with a flag-staff on the highest, which can be seen from the anchorage over the intervening high ground. Next to Diu, Jafrabad is the most considerable place for trade on the S. coast of Katiawar. It belongs to the Sidi, or Abyssinian chief of Jinjira (Rajhpuri) on the coast of South Konkan, and is governed by an officer holding under him; this territory, including eleven villages annexed to it, possesses a population estimated at 5,680. Though a convenient place to water at, the water is not very good. It is procured from a well between the town and the point. Fire-wood is scarce, and so are supplies of all sorts for shipping, but good poultry may be had.

Hills. Nandiveli Mountain, 1,847 ft. above the sea, the S.E. peak of the Girh Hills, stands 17 m. to the N.W. of Jafrabad. About 10 m. to the N.E. of this mountain there is one called Dhuans-ke-donghur, or Smoke Hill, only seen in clear weather; and E. of this it is all hilly country as far as Mowah. Between Nandiveli and Jafrabad are two hills more conspicuous than others, the Conical Hill, 7 m. to the N.W. of the harbour; and Round Hill, of about equal elevation, perhaps 500 or 600 ft., 3 m. to the W. of the Conical Hill: these two hills stand out better than the rest of the range.

Tides. It is H. W. on F. and C., at 11 h. 35 m.: ordinary springs rise 9 ft.; high springs, 10 ft.; neaps, $4\frac{1}{2}$ ft. Outside of the harbour, at neaps, the stream of ebb ran more than 2 hours

after it was L. W. by the shore, and the flood-stream continued more than $1\frac{1}{2}$ hours after H. W. At springs the ebb ran $2\frac{1}{2}$ knots an hour to the W.S.W., and the flood $1\frac{1}{2}$ knots to E.N.E.

Murex Reef, about 2 m. long, and parallel with the coast, off which it lies at $\frac{1}{2}$ m., dry at L. W. only, commences at 4 m. to W. by S. of Jafrabad, and extends about 2 m. towards Rajpur; the coast on that side being higher than the Jafrabad side; and the E. extreme of it, overhanging the reef, is called Murex Bluff, which is W. by S. $\frac{1}{4}$ S. $5\frac{1}{2}$ m. from Jafrabad Point. This is the S.E. limit of the territory of the Nawab of Junaghur: the village of Roinsia, mid-way between Murex Bluff and Rajpur, being the frontier village.

SHIAL BET, SEARBET, or SHALBET ISLAND, in lat. $20^{\circ} 54' N.$, lon. $71^{\circ} 30' E.$, is 8 m. to E.N.E. of Jafrabad, and 17 m. from Mowah Point, the coast between them being indented with small sandy bays, with occasional rocky shoals parallel and attached to the shore. The Island lies about 2 m. from the main, and is about $\frac{1}{2}$ m. long on its sea-face, which is steep-to and 57 ft. high. It is little more than $\frac{1}{2}$ m. broad, and has old fortifications on its N.W. and S. points, the latter being of strong construction. Being lowest on its N. side, where the village of Shalbet is, the Island rises to a steep cliff at the sea-face, which is deep-to, having 10 or 12 fathoms close to the shore, but a sand-bank with only 6 fathoms lies about 1 m. off it. The coast W. of Shalbet forms in a high projecting bluff, the S.E. point of which bears W.S.W. 2 m. from the W. point of Shalbet; the rocky reef from the bluff extending E. over nearly two-thirds of that distance, and rendering the passage into Shalbet Harbour difficult, unless marks or lights be erected.

The Island is of sand-stone, and belongs to the Rajah of Jafrabad. Good water may be had from a well in the centre of the Island. This was formerly a famous piratical stronghold, and might be made a safe harbour, as one is much wanted along the S. coast of Katiawar. Chanch Creek extends some 6 m. to the N.E. of Shalbet, and has several branches through that extensive swamp. The detached islet on its E. side, called **Savai Bet**, which may be said to be part of Shalbet Island, is of nearly equal elevation, and conspicuous from its E. end being a steep, well-defined bluff. On its peaked bluff is the house of a peer (a Mahomedan saint), with the usual little white flags by it; which may be seen about 9 m. off.

Anchorage. On the N. side of Shalbet there is capital anchorage, affording shelter in the S.W. monsoon; but the entrance, which is $\frac{1}{2}$ m. W. by S. of the island, is narrow, between a shoal bank off the island and a reef of rocks from the main land, thus reduced to a breadth of only 2 or 3 cables. At this anchorage there is 5 or 6 fathoms (L. W. depth), muddy bottom, at the distance of 3 cables' lengths from the N.W. point of the Island, and the same distance from the S. spit of Chanch River bearing N.W. To the E. of this anchorage the water is shoal, but a vessel could run out at H. W., in 4 fathoms, taking care of the sand-bank which extends off the island for a distance of 2 m. E. of the anchorage.

Another anchorage may be found between Shalbet Bank and Abusalia Rock, or $\frac{1}{2}$ m. W. by S. of the latter, where there are 6 or 7 fathoms, mud, protected a little by the reef, which, projecting E. from the S.E. point of Shalbet, may be brought to bear S. by W., though only visible at L. W. The tides are much the same as at Jafrabad.

CHANCH TOWN, situated in the middle of a narrow island, and 4 m. to N.E. of Shalbet, is 6 m. about W.S.W. from Islet Point: mid-way between them is the small village of Kaira, on a projecting point of the coast. Chanch Island is between 4 and 5 m. in length along the sea-shore, but nowhere $\frac{1}{2}$ m. broad; it is highest (80 ft. above sea) to the E. of Chanch Town. There is an extensive mangrove swamp at the back through which runs Chanch Creek, the entrance of which is to the N.W. of Shalbet Island, and it runs up to Kathiwadah, 4 or 5 m. to the N. of Chanch. Pipalwao Bunder, at 4 m. to N.W. of Chanch, is the W. limit of the territory of the Rajah of Baonugga, which extends round Goapnath Point to Baonugga.

Abusalia Rock bears S.W. by S. 3 m. from Chanch Town, and rather more than 1 m. E.N.E. from the E. conspicuous bluff of Shalbet Island. There is deeper water, 15 and 16 fathoms, to the S.E. of this rock and of Shalbet Island, than anywhere else along this portion of the coast. And here it may be noted that, as a general rule along this coast, where rocks project from the shore, the water is deeper close to them than in the offing, owing to the scouring of the currents.

PAURADHAR ISLET, in lat. $20^{\circ} 58' N.$, lon. $71^{\circ} 41' E.$, is 80 ft. high, and stands off-shore about 1 m. to the S. of the cape which Captain Ethersey called **Islet Point**. Pauradhar is steep-to, and to the W. of it lies Putwa Bay, giving shelter from E. winds. Other islets extend from it in a chain to E. by N. for more than 2 m.; they are connected with each other and with the shore by rocks dry at L. W., and thus they form the E. side of Putwa Bay; the E. extreme of these rocks lies about $1\frac{1}{2}$ m. off the main land, which to the N.E. of the rocks begins to project to the E. for 1 m., and then trends to E.N.E. to a cape, about 80 ft. high, that forms the W. side of Mowah Bay, within which is Mowah Bunder.

Tides. At Mowah Bunder it is H. W. on F. and C. at 1 h.; ordinary springs rise 12 ft., neaps 7 ft. In the offing, the flood-stream sets about E.N.E. at the rate of $2\frac{1}{2}$ knots per hour; the ebb to W.S.W. about $3\frac{1}{2}$ knots, and running for nearly two hours after the water along shore had begun to rise.

MOWAH BAY, 17 m. to N.E. by E. of Shalbet, only affords shelter to coasters, which can at H. W. run up the creek to the bunder, which is 2 m. from the mouth of the bay. The E. side of Mowah Bay is formed by an island, the E. extreme of which is called **Jegri**, or **Jigi Bluff**, off which to the E. a **two-fathoms' shoal** extends nearly 1 m.; but to the N. of this shoal the water is deep, and affords some shelter from W. winds in Kutpoor Bay. **Mowah Town** is a large place at 2 m. to N. of the bunder, having several buildings and a Hindoo temple, visible a good way off. Good water may be had at a well on Jegri Island. Between Kutpoor Island and Mowah there is a very extensive swamp, extending several miles to the N.E. and S.W.; the islands that front this swamp are about 60 ft. high, and form a continuous line N.E. by E. from Mowah Bay to **Kutpoor Bluff**, which is 12 m. from Jegri Bluff and 2 m. W.S.W. from Maitlah Point. During W. winds, boats can land on the N. side of Kutpoor Bluff.

Methlah, or **Maitlah Point**, which is about 7 m. to the S.W. of Goapnath Point, has a little creek on its W. side, only accessible to boats towards H. W., and during E. winds; it runs towards Maitlah Village, which is about 2 m. to N. of the point. Bhensla Rock, about 2 cables off shore, and connected with it by sunken rocks, stands $2\frac{1}{2}$ m. to N.E. of Maitlah Point. **Janmeer**, a walled town, stands nearly mid-way between Maitlah and Goapnath Point; this and Rajpur, a little further to E., were formerly notorious piratical places.

GOAPNATH PAGODA, a Hindoo temple, in lat. $21^{\circ} 12' N.$, lon. $72^{\circ} 6' E.$, situated near the prominent point of that name, stands about 150 ft. above the sea, and is 6 m. S. of the entrance of Sutrinji River. The temple, not a remarkable building, is nearly surrounded by a copse of bushy trees, $\frac{1}{2}$ m. to N.N.W. of the tip of Goapnath Point (on which there is now a bungalow), and may be seen in clear weather 15 or 16 m.

Goapnath Shoals. Off Goapnath Point a reef extends to N.E., almost joining the Sultanpore Shoal. South of the point the coast may be approached quite close into 7 fathoms. The channel between Goapnath Shoals and the Malaiki Banks is only 6 m. broad. The nearest dangerous shoal-patch of the Malaiki Banks bears S.E. 6 m. from Goapnath Point; the intermediate soundings are irregular, and the depth is no guide, but sandy bottom will be found by the banks, and mud towards the shore of Katiawar. The bed of this channel, between the coast and the Malaiki Banks, appears to be very flat; and the soundings do not show how far a vessel may be off shore. The coast to the W. of Goapnath Point is of sand-stone, presenting towards the sea perpendicular cliffs, about 100 ft. high. It is everywhere safe to approach into 6 fathoms, at L. W., this depth in some parts being close to the cliffs.

SULTANPORE, a small trading port, the first to the S. of Gogah, on the banks of the Sutrinji River, bears N. by W. 7 m. from Goapnath Point. Good water may be obtained from a well close to the bunder or landing-place, about a mile within the entrance of the creek. There is good anchorage for small craft, in 3 fathoms, mud, between the Sultanpore Shoal and the town. The Sutrinji River has its source on the N.E. of the Girh Hills, and runs past Paulatana Mountain, which was therefore called by early navigators Sutrinji, or Setrujah Hill.

Tullijah Hill, bearing 8 m. W.S.W. from Matowra, 10 m. N.N.W. from Goapnath Point, and $4\frac{1}{2}$ m. to the N.W. of Sultanpore, is a small steep hill of conical form, about 400 ft. above the sea, and rising out of a level plain; there is a range of hills between it and Baonugga. On the top of Tullijah Hill is a Hindoo temple, having tanks of excellent water; the hill has caves excavated in the solid rock, where formerly the pirates of these parts dwelt, even as recently as the year 1823.

Paulatana Mountain, spoken of by early navigators as Setrujah Hill, and standing about 13 m. N.W. by W. $\frac{1}{2}$ W. from Tullijah Hill, is 1,977 ft. above the sea, and may be seen in clear weather from a greater distance than Tullijah Hill. Paulatana, though not marked on the charts, is upwards of 20 m. to N.W. of Goapnath Point. It is of trappean formation, and celebrated for its numerous Jain temples and monastic establishments of those singular religionists, who are rather numerous in Katiawar, where there is scarcely a village of any size which has not several of their families. On Paulatana and the Girh Mountains (Geernar) their principal temples are found.

Sultanpore Shoal, of rock, sand, and clay, with a patch of sand nearly dry at lowest spring-tides, lies $4\frac{1}{2}$ m. E. from the entrance of Sutrinji River. The N. end of this foul ground bears N.E. $\frac{1}{4}$ N. 9 m. from Goapnath Point. With Tullijah Hill bearing W. $\frac{1}{2}$ N., a vessel is clear to the N. of it. It is almost connected with Goapnath Point by other banks, between which there are passages; but, as they change annually, no directions can be given.

TIDES. Inside the Sultanpore and Goapnath Shoals, it was found to be H. W. on F. and C.,

at 2 h. 25 m.; but the ebb-stream did not make till more than one hour afterwards, and continued for more than 1½ hours after the water had commenced rising by the tide-gauge on shore. At neaps the flood-stream was found to run two hours after actual H. W. Rise and fall at ordinary springs was 16 ft.; at high springs, 18 or 19 ft.; at neaps, 9 or 10 ft.

THE COAST above Sultanpore goes to N.E. by N. for about 11 m. to **Sonchia Point**, off which patches of rocky ground extend for 1 m., having 7 fathoms, water, close to them. Vessels should not shoal here under 10 fathoms. Goriali Village (with a white tower, conspicuous from sea) stands 2 m. inland, and mid-way between Matowra and Metiveli. **Matowra** is 7 m. N.E. by N. from Sultanpore; it is situated at the S. extreme of the hilly country which extends hence to Gogah. There are thick trees round all villages, and the black-thorn bush (without foliage) grows in the valleys, forming thick jungles; several streams of fresh water fall into the sea for a short time after the rainy season.

Shoal. Casts of 5 fathoms (probably less water now) were found on a bank about half-way from Matowra across the Gulf towards Dandi Light, or about on an E. by S. bearing. As this is nearly beyond the range of visibility of Perim Light, vessels going to S. round Goapnath Point should keep Perim on a N. by E. bearing whilst in sight, and stand on a S. by W. course till 22 m. from that island; then haul up to S.W., and after passing through the deep water (20 fathoms) to the E. of Goapnath Point, should not shoal in the Grant Channel to 10 fathoms till she is about 10 m. to the S. of that point. Sandy bottom will indicate that she is on the side of the Malaiki W. bank; muddy bottom will show that she is nearer the main land.

Kura Point, which is 28 m. N.N.E. of Goapnath Point, and 3 m. to the N.W. of Perim Light-house, is the most E. portion of the Katiawar sea-board to which vessels can approach. A fringing reef borders it, the rocky ground off which extends off 2½ m.; the whole of this foul ground, from Kura to Baonugga, is called **Mohamdi Bank**. When the tide is out, it leaves a deep channel of only ½ m. in width between the S. end of this bank and Perim Reef. Foul ground extends off the shore, from Kura to the S. for several miles, and vessels should avoid it by going outside Perim Island.

PERIM ISLAND. The centre, where the light-house stands, in lat. 21° 35' N., lon. 72° 20' E., bears from Gogah Light S.E. ¼ S. 6½ m.; from Broach Point about W.S.W. 11 m.; and from Dandi Light N.W. ¼ N. 21 m. That part of the island which is always above water extends for ½ m. to the N.W. and S.E. of the light-house, but is very narrow. The rocky reef which surrounds it projects furthest to N. and S.E.; and although this, when dry at L. W., appears quite steep-to, yet a gradually shoaling sand and clay-bank extends off it on the N., the E., and the S.; but on the W. it is very steep-to, and between the N.W. end of the Island and Gogah, where at L. W. the passage is reduced to a width of little more than ¼ m., there is a depth of 60 fathoms; here the strength of the ebb tide was once estimated at 12 knots; the surveying vessel went through it, but was perfectly unmanageable, being turned round frequently by the strong eddies. The bottom is a yellow clay. Perim is sandy, with low sand-hills on the W. and N. end; the E. side is cultivated by the people in charge of the light. There is excellent water in a well 26 ft. deep. The base of the Island is pudding-stone, exhibited at L. W. at the S. end of the reef, which terminates in a cliff, exposing horizontal strata of pudding-stone, from 1 to 3 ft. thick, alternately with fine clay only a few inches thick. Many fossil bones have been dug out of the reef.

Tides. The great velocity of the tides near Perim Island must be remembered, as, with a scant wind, it is hopeless to keep the vessel under control. On the E. the island may be approached within 2 m.; on the N.E. not within 3 m.; but on the N. not within 4 m., as a rocky 1-fathom patch, called Perim Shoal, lies on the N. side of Perim Bank, and at a cable's length to the W. of this shoal there is a depth of 30 fathoms. Little or no flood-stream is felt on the N. of Perim Reef, but the ebb is very strong.

Perim Shoal, least water 1 fathom, the above N. danger, 3½ m. due N. of the light-house, is to be avoided by the following land-marks:—Two brab-trees, situated 3 cables' lengths to S.W. of Gogah Town wall, and a large bushy peaked tree to the W. of them. The N. brab, cutting the N. side of the large peaked tree, is the mark for rounding closely the N. dangers of the Perim Shoal. A vessel is in danger if she has the large peaked tree open to the left of the N. brab, until Perim light-house bears S. by E. The anchorage for large ships off Gogah is 1 m. N.W. of this shoal. The swell in the S.W. monsoon is there, only troublesome towards H. W.

LIGHT. Perim Light-house, in lat. 21° 35' N., lon. 72° 20' E., shows a *fixed* light, 86 ft above H. W., on a mast, above a solid stone basement, 25 ft. high, situated on a sand-hill. At H. W. it is visible 12 or 13 m., and at L. W. 14 or 15 m., from a vessel's deck in clear weather.

GOGAH, or GOGG, a walled town, situated 9 m. to the S.E. of Baonugga, has a small *fixed* light on its N.E. side, which is 6½ m. N.W. ¼ N. from Perim Light. There is a large banyan-tree

at 4 m. W.N.W. of the light; and to S.W. of the town, at the distance of 3 cables, is a large peaked tree, very conspicuous, with two brab trees to the S.E. of it. The best Lascars in India are natives of this place. Ships touching here may procure water and some refreshments. Firewood is scarce. Gogah Road is a safe place for vessels to remain at during the S.W. monsoon, or to run for (*see* page 367), if they part from their anchors in Surat Road, having a considerable extent of anchoring-ground, with mud and clay bottom.

Gogah Shoal is a narrow sand-bank lying in the direction of the stream, its S. end being nearly 3 m. E. of the town. One mile N.W. of it, or 2 m. N.E. of Gogah Light, is the little **Perigee Rock**, which covers and uncovers: at L. W. of ordinary springs being just awash, and sometimes being 3 or 4 ft. above water. South of Perigee Rock, and E. of Gogah white mosque, there is a patch of clay, having only 5 ft. at lowest tide.

LIGHT. At the N.E. angle of the town a small *fixed* light is exhibited, estimated at about 40 ft. above H. W., but visible only 7 or 8 m. The light is close to the mouth of Gogah Creek, which runs along the N. side of the town.

Mohamdi Bank, the shore-bank stretching from the rocky reef off Kura Point to the entrance of Baonugga Creek, is principally composed of a red and yellow clay, with occasional patches of sand; the Gogah Shoal is one of such sandy patches on this Mohamdi Bank: all the rocky part on the S. end of the Mohamdi Bank is comprised within a radius of 3 m. from Kura Village to the N.E.

There are two shoal banks, nearly dry at L. W., 2 and 3 m. to the E. of Gogah Light; to avoid these, when anchoring near Gogah, keep the large peaked tree and two brabs in sight to the S. of the town walls; but a small vessel arriving here towards H. W., can go over all the shoals, and pick out deep water for anchorage.

ANCHORAGE. There is a little gut of deep water off Gogah Town, which Gogah pilots can point out and lead a steamer there towards H. W. Large vessels must anchor in 5 to 10 fathoms, clay bottom (L. W. depths), about $3\frac{1}{2}$ m. off Gogah, with Perim Light-house S. by E., Kura Point S.W. by S., and the N. brab and peaked tree in one, bearing about W. $\frac{1}{4}$ N., or with the large banyan tree just open to right of the town. From this anchorage, Perim Shoal bears S.E., distant 1 m. It is safest for a vessel to weigh anchor about H. W.

Tides. At Gogah it is H. W. on F. and C. at 3 h., but the stream flows on for a full hour afterwards, though the water has fallen more than a fathom. Rise and fall at very high springs 34 ft.; ordinary springs 27 to 30 ft.; neaps 12 to 18 ft. Through the deep gut between Perim and Kura Point, which is at lowest water little more than $\frac{1}{2}$ m. wide, the tide rushes with great velocity, generally 7 or 8, and sometimes 10 knots, therefore the passage had better not be attempted.

BAONUGGA, or Bhownuggur Town, bearing S.S.W. $\frac{1}{4}$ W. 27 m. from East Cape, is a large place, but difficult of access, being approached by a winding creek; off the entrance to which a vessel may anchor in from 7 to 10 fathoms, having the Baonugga Shoal about a mile to E., and with Gogah Light bearing S. by E. $\frac{1}{4}$ E., or Perim Light S.S.E. $\frac{1}{4}$ E., the centre of Baonugga Town about W., and the large banyan tree between Gogah and Baonugga S.W. by S. Baonugga is a place of considerable trade. Though under the jurisdiction of the British district of Ahmedabad, it is the residence of the Rana or Chief of Gohilwar, hence called Thakoor of Baonugga. Native pilots must be had to take a vessel up to the town.

Baonugga Shoal is a sand-bank lying $1\frac{1}{2}$ m. from the shore-bank, and between 6 and 7 m. to the E. of that town. The ship channel is to the W. of Baonugga Shoal, and through it the tides run 6 knots an hour at the springs.

The Coast. From Baonugga to Koon Bunder the 36 m. of shore is principally mangrove jungle for several miles inland; in parts covered with a coarse grass unfit for cattle; numerous creeks intersect it, and high tides overflow it for a considerable distance inland. Towards Gogah it gets higher, and some little hills are seen in the background. There are three towns along this coast of importance in the cotton trade; **Soondri**, in lat. $21^{\circ} 58' N.$; **Baoliari**, in lat. $22^{\circ} 2' N.$; and **Dholera**, in lat. $22^{\circ} 11' N.$; the latter town is connected with its port by a tramway. No vessel could find out these places without a pilot. **Koon Bunder** is the most N. port in the Gulf of Cambay, it is situated at the entrance of Amlī Creek.

Light. Koon Bunder shows a *fixed* light on a mast, 48 ft. above H. W. mark, in lat. $22^{\circ} 17' N.$, lon. $72^{\circ} 18' E.$; this is of great use to small native boats.

CENTRAL BANKS of the GULF. To the S.E. of the Baonugga Shoal there are shifting sands for a distance of nearly 5 m.; these are connected with the Rhuk Bank, the N. end of which is off Baoliari Creek. There is a shoal patch of $3\frac{1}{2}$ fathoms on the *tail* of the Great Mal Bank, E.N.E. of Gogah, and rather more than 6 m. N. of Perim Light-house. Again, further to the E., there were found in 1852 soundings of 7 and 8 fathoms, near where 30 is marked on the

chart, about 6 m. N.E. $\frac{1}{4}$ N. from Perim Light-house. There is reason to believe that shoal water did *formerly*, at the time of the survey, exist there; but that part was not thoroughly examined. Throughout the Gulf of Cambay, a vast of very deep water indicates the near approach to a shoal. Doubtless all these banks are extending further to the S., and we know they frequently shift their position during the stormy season.

Tides. The tide-stream flows at Broach Roads till about 4 h. 30 m. on F. and C. of moon, but H. W. occurs at 3 h. 30 m.; velocity sometimes 5 or 6 knots per hour, the tide rising above 30 ft. perpendicularly at springs. On the E. side of the Gulf the flood-stream sets about N. by E., and the ebb S. by W., except where their direction is altered by the form of the sands.

Mal, or Mahl Bank. The centre of the upper part of the Gulf of Cambay is choked by this large sand-bank, which lies between Tankaria and Baonugga; it has many practicable little cuts or boat channels through it. It is pear shaped, the stalk being to the S.; when surveyed in 1835, its length was 16 m., but it is increasing to the S. In 1852, the surveying vessel *Pounah*, when passing from Broach to Gogah, found much shoaler water on its S. end than the charts show; and thus it is supposed that a greater deposit has accumulated at its S. dry extreme, which may now be defined by a line drawn from Gogah to Dedjbara brab trees, at the back of Dedj sand-hills. There is a channel 2 m. broad between the Makrah Bank and the Mal Bank, and between the latter and the bank which dries off the shore N. of Deojugan Pagoda. The Malcolm Channel, round the W. side of the Mal Bank, is deep, but must not be attempted without a local pilot.

The numerous lights now exhibited in Cambay Gulf render navigation easy; but the banks and shoals are insufficiently known, as the N. ones change much.

Makrah Bank, composed of sand is 11 m. in length, N. and S., and situated 5 or 6 m. from the Surat coast, between Broach Point and Tankaria Point, its extremities being distant from each of those respectively about 5 m. In the centre of the bank is a patch which dries at L. W. springs, but the general depth is from 1 to 2 fathoms. Its N.E. end is broadest, almost reaching to Tankaria Roads, and no large vessels should attempt to come up here without a pilot, as the tides are so rapid and the soundings very little guide. Between the Dedjbara Shoal and Makra Bank, there is a channel 2 m. wide.

CAMBAY Town, in lat. $22^{\circ} 18' N.$, lon. $72^{\circ} 35' E.$, 9 m. N.N.E. of Gongwa, is a large town on the N. side of Mhye River entrance. In 1820 the native vessels used to lie close to the town; but from that date till 1836 the stream receded, and a bank formed off the town, preventing vessels coming nearer than 2 m. In 1836 the surveyor found that bank being rapidly cut away; and the approach to Cambay has been better of late years, but no vessel should go there without a pilot. The tide is so rapid, that a vessel taking the ground would immediately overset, and probably every person on board perish, a result which has frequently happened through the neglect or obstinacy of the pilots. In this part of the Gulf the flood sets N.E. into the Mhye or Cambay River, and the ebb S.W. The smallest vessel should not attempt the navigation without a pilot.

TANKARIA BUNDER, in lat. $21^{\circ} 59' N.$, lon. $72^{\circ} 37' E.$, on the Dhardur River, is a town on the N. shore, about 7 m. E.N.E. of Deojugan, and 9 m. from the anchorage in the roads. There is a custom house with a creek where boats take in cargo. The river is only $\frac{1}{2}$ m. wide at Tankaria. From this river, cotton, grain, and oil are exported in great quantities to Bombay and other places; and small steamers ply between it and Bombay in the fine season. Tankaria, or Jumbaseer Road, may be known by the entrance of the river being open, and a pagoda called Deojugan on the N. side of it, off which vessels may anchor in 7 fathoms at L. W., with the pagoda bearing N.E. by N. $3\frac{1}{4}$ m. A native pilot is required to take a vessel farther in.

Light. Deojugan or Tankaria Light is *fixed*, elevated 50 ft. above H. W., and situated a little N. of the pagoda, in lat $21^{\circ} 55' N.$, lon. $72^{\circ} 30' E.$

The COAST. From Jumbaseer or Tankaria Road to Broach Bar, a flat, dry at L. W., projects $1\frac{1}{2}$ and 2 m. from the shore, with deep soundings close to it, for it is steep-to. The coast from Dedjbara Creek to Tankaria is very low and marshy. Gundar, the only village near the coast, has a conspicuous building. In passing along here, a vessel should keep within 3 m. of the shore, in 7 or 8 fathoms at L. W.; and, in working, she ought not to stand far off, as the Makrah Bank lies 5 or 6 m. off the shore-bank, and the tide is so rapid, that great difficulty would be found in regaining the shore were the wind to fail whilst she is in the offing. Dedjbara Shoal is a small sand-bank, with not less than 3 fathoms over it, $1\frac{1}{2}$ m. long, and lying parallel to the shore-bank, between which and itself there is a channel $\frac{1}{2}$ m. wide, with 10 and 11 fathoms, water. From the S. end of this shoal, the Dedjbara brab trees bear E. $\frac{1}{4}$ S.; and from its N. end a single brab bears due E.

BROACH POINT, or Lahara Point, to the S. of Dedj Sand-hills, is 20 m. N. by W. from Dandi Light, and 11 m. E. by N. $\frac{1}{4}$ N. from Perim Island Light-house. This is the highest

part of the coast, and consists of sand-hills covered with bushes; near by, there are several topes of banyan trees, and a little to the E. a small grove of brab trees, high, and remarkable for their being all of the same height, except two, which stand up above the rest. **The Broach, or Nerbudda River**, has its source in the Vindhya Mountains, in the British district of Ramgurh in Bengal, at a distance of 800 m. from the Gulf of Cambay. Few rivers have a more direct course; perhaps no river, of the same magnitude and length of course, receives so few important tributaries. The tide is perceptible only 25 m. above Broach, or altogether 55 m. from the sea; and throughout this tidal length its breadth exceeds 1 m. The town of Broach is situated on the N. side of the river, a great way up; vessels of considerable burden may proceed to this place, as the channels are deep in many places, but too intricate to be navigated without a pilot.

Anchorage. Broach Roads, off the bar at the entrance of Broach or Nerbuddah River, are 5 m. S.S.W. of Broach Point and 18 m. N. of the S. danger of Gulwala Bank. The bar of the river is about 4 m. from Broach Point. A vessel may anchor off the bar with Broach Point N. by E. distant $4\frac{1}{2}$ or 5 m. and Perim Light-house W. $\frac{1}{2}$ N. in 6 fathoms at L. W.

The Coast. The mouth of the Nerbudda or Narbada River, is funnel-shaped and very wide; from Broach Point to the N. side of the Keem or Contijal Creek, it is 5 leagues in width, a mass of sand-banks with two or three channels through them, but altering every year. **Hansoot Bunder** is on the S. shore, about 14 m. E. by S. from Broach Point. **Keem Bunder** is up the creek of that name, and not far from the railway. Bhogwa-Dandi is another small port about 16 m. to the N. of Vaux's Tomb, for which the following light has been erected.

Light. **Dandi Point**, in lat. $21^{\circ} 20' N.$, lon. $72^{\circ} 35' E.$, has a small *fixed* light, visible 10 m., bearing N. by W. 14 m. from Tapti Light, and 21 m. to S.E. of Perim Island Light.

Gulwala Bank, with 2 fathoms and less at L. W., is about 6 m. long, N. and S., and lies abreast of Dandi; its S.W. danger bore W.S.W. 6 m. from Dandi Light, and was $13\frac{1}{4}$ m. to N.W. by N. of the Tapti Light. **Bhogwa Sands** lie between this and the main, and this intricate navigation (with its rapid tides) should not be attempted without a native pilot. There is a channel through which the small coasting vessels pass in 3 and 4 fathoms water; but at night, or in a large vessel, it is advisable to keep well out to the W. of these sands and of the Gulwala Bank. From Broach Bar to Surat River, a continuous bank extends along the shore, which bank at Broach river entrance (where the main land recedes very much) projects out about 5 m. **The N.E. danger** of the Malaiki Banks is only 6 m. to the S. of Gulwala Bank.

THE BORE OF CAMBAY GULF. It may be well in this place to give some description of that dangerous rushing tide, called the Bore, in the Gulf of Cambay; because navigators, going to the N. of Perim Island, should be on their guard against it. The tides throughout the Gulf are extremely rapid, and the rise and fall great. The whole shore, bordering on the sea, is low, and overflowed for some distance inland at high springs, being intersected with numerous small creeks and ravines. The Bore is a rapidly flowing tide-wave, forced through a narrow passage, over the remains of ebb tide, the counter-action of which helps to give the wall-like aspect of the Bore.

The E., or Principal Bore, rises to the E. of the Bore rocks, about 11 m. S.W. of Cambay Town, and is not perceptible on the neap tides, unless the previous springs have been very high, when it may be noticed slightly through the quarter. When the springs begin to lift, it plainly shows itself, increasing in height and velocity till two days after new or full moon, when it declines. When new moon coincides with *perigee*, and the full moon with *apogee*, the highest tides are said to occur. The Bore varies with the night and day-tide, the former being 6 to 8 ft. higher than the latter, between Sept. and April; and as the flood stream of both night and day runs for the same length of time—about 3 hours—the highest, or the night-tide in the fine season, and day-tide in the rainy season, must have the greatest velocity.

In Jan. 1837, at very high springs, in Cambay Creek, about 5 m. W.S.W. of the town, the Bore was observed 6 ft. high, advancing at the rate of 10 knots per hour, with a loud noise, between the steep cliffs on the N. and the sand-bank on the S., in a passage about 500 yards broad. A quarter of an hour after the bore-wave had passed, the stream was found running at the rate of $4\frac{1}{2}$ knots only; but, three quarters of an hour after its passage, the flood-stream attained the velocity of 8 knots, afterwards gradually declining; the ebb stream beginning 3 hours after the passage of the bore-wave.

The rise of the night tide in those 3 hours of flood was 31 ft., and the rate of its rise was as follows:—In the first 10 minutes of flood-tide the water rose 6 ft.; in the first hour $18\frac{1}{2}$ ft.; in the second hour $8\frac{1}{2}$ ft.; and in the third hour only 4 ft.

The day-tide at the above position only rose 23 ft. The ebb-tides run steady, but do not acquire their greatest velocity, which is about 7 knots, until more than half tide, when the high banks are uncovered, and the stream is confined to its narrow channel. Off the village of Dawan,

on Jan. 10th, 1887, the Bore was observed 7 ft. high, with an initial velocity of 10 knots; but, after the wave's passage, the speed was reduced to 5 knots, increasing again to 7 knots three quarters of an hour afterwards, when it gradually got weaker till the ebb made.

The W. Bore, which runs up the Sabermati, is very similar to the other, but of less elevation and force; but both tend to cut away the banks and form new ones, so altering the channels as to render their navigation by strangers an enterprise not to be attempted. On the W. bank of the Sabermati, between Amli Creek and East Cape, the surveyors in 1837 found that a strip of bank, of a breadth from 700 to 1,300 yards, throughout a length of 5 m., had disappeared in one year.

The above description of the Bore shows that the flood-tide comes with a sudden burst at great velocity; then, decreasing in strength for a time, attains its full strength about three quarters of an hour after the passage of the bore-wave. The stream afterwards never attains the same velocity as the wave of the Bore. Below Gongwa on the E. side of the Gulf, and Dholera on the other, there is no bore: but to the N. of these places there are the two described above.

THE MALAIKI BANKS AND NAVIGATION OF CAMBAY GULF.

The Malaiki Banks (commonly called **Malacca Banks**), although having narrow tongues of shoal water as far S. as lat. $20^{\circ} 20' N.$, may yet be said to have no dangers S. of a line drawn between Damaon on the Surat coast and Jafrabad on the S.E. coast of Katiawar. Their N. limit of danger is defined by a line running E. and W. between Surat Town and Goapnath Point. To the N. of this line all the numerous banks have distinctive names of their own. Between Goapnath Point and the Nerbuddah River the Gulf has never been thoroughly examined, though the chart shows a patch of 5 fathoms in the very centre. (See page 362, before Kura Point). The W. limit of the Malaiki Banks lies 30 m. to the S.S.W. of Goapnath Point, or 22 m. to the E.S.E. of Shalbet Island, on the S.E. coast of Katiawar.

There are four banks, the Eastern, the Breaker, the Nerbuddah, and the Western; and, though there are deep channels between them, these become very narrow at their N. mouths, rendering it inexpedient to attempt the passage through them. **Nerbuddah Bank** shows a large extent of sand, dry at L. W., half-way between Surat Road and Mowah Harbour in Katiawar. **Breaker Bank** has, at the distance of 20 m. S.W. $\frac{1}{2}$ S. from Tapti Light, a knoll of sand, which is seen at H. W. of neap tides, though submerged at high springs. This sand is in lat. $20^{\circ} 50' N.$, and lon. $72^{\circ} 28' E.$, and from the mast-head may be seen a great distance when the sun shines.

The Head or N. limit of Malaiki Banks should never be approached with an ebbing tide; being steep-to, the soundings give no sufficient warning, and, were a vessel to take the ground, she would be overset in an instant by the rapidity of the tides. The E. danger of these banks is about 5 m. from Surat Bar, having one and 2 fathoms on it at L. W.; Vaux's Tomb, or Tapti Light, bears from it N.E. The E. patch of sand, which is dry at L. W., is 18 m. W. of the entrance of Kundi kari, or distant 13 m. bearing S.W. by S. from Surat Roads.

The N.E. danger, or head of the banks, is 6 m. W. of the little hill which is said (by Fryer, in his "New Account of East India and Persia," in the end of the 17th century), to be Tom Coryat's tomb, which is close to the sea, about 5 m. to the N. of Tapti Light, and 2 m. N. of Suali sand-hills. The channel between the banks and the shore, the **Sutherland Channel**, a part of which was called by early navigators Suali (Swally) Roads, is about 3 m. broad; this shore-bank projecting out $1\frac{1}{2}$ m. at L. W. These were called the inner and outer sands of Suali, and are both dry at L. W. **The E. Reef** of the Malaiki Banks is very steep-to on its E. edge, occasioned by the great rush of tide sweeping along it. As the deepest water is within a mile of the dangers on the bank, a vessel in working, should be warned by deep water, and go about at the first shoaler cast.

Approaching Surat from the S. Between Damaon and Surat River the land near the sea is low, covered with trees, and in some places it is inundated during high tides in the stormy season. When round the foul ground of Sunjan, and abreast of Damaon, steer along the shore for Surat Road, and do not stand farther off than 7 or at most 9 m. from it, nor deepen above 14 or 16 fathoms. In working, stand in to 5 or 6 fathoms on the soft bank lining the shore; but, if anchoring at H. W. on the edge of this bank, to benefit by the first of the following flood, do not anchor under 7 fathoms at spring tides, because the water falls sometimes 19 or 20 ft. The *Gunjavar*, a large ship, drawing 21 ft., bound from China to Surat in the year 1788, having anchored in $6\frac{1}{2}$ fathoms off this part of the coast, grounded in the soft mud at L. W.

With Parnera Hill bearing E. $\frac{1}{2}$ N., the Omersari and Bulsaur Flats extend a great way out, with a narrow 7 fathoms shoal half-way to the Malaiki Banks. The Omersari spit, with different depths on it, from 8 to 13 fathoms, may sometimes be a guide in the night, when passing at 5 or 6 m. from the shore (if the lead is kept going), as the water will shoal suddenly in crossing it, and

soon return to the former depth when over the spit. Having passed 10 or 12 m. to the N. of Parnera Hill, a ship should steer along shore, in soundings from 7 to 9 or 10 fathoms; but, in working, if she stand far out and get a cast of hard ground, or shoal on the edge of the Malaiki Banks, after passing through the deepest water which has upwards of 20 fathoms only 1 m. to the E. of the banks, she should tack instantly towards the land. When within 12 or 15 m. of Surat Road, she ought to work from $6\frac{1}{2}$ to 7 fathoms towards the shore, to 10 or 12 fathoms in the offing, as the channel then becomes more contracted; 9 fathoms is a good track with a fair wind.

Stormy Weather. In Surat Road, and in the entrance of the Gulf of Cambay, Southerly winds and blowing weather set in sooner than at Bombay. It is considered dangerous for ships drawing much water to remain in the road after the middle of April; for in this month and early in May, smart S. winds frequently blow during the springs particularly in the night, with the flood-tide. These winds produce a considerable sea, which by the strength of the tide strikes forcibly against a ship, causing her to drive and bring both anchors a-head. It is therefore advisable, when a ship is detained in Surat Road late in the season, to keep at single anchor, with a good cable down, sighting it at every convenient opportunity; by so doing she will ride better in blowing weather than if two anchors were down; and should circumstances make it necessary to cut or slip, only one anchor will be left on the ground.

At such times it is prudent to keep a pilot on board, that he may carry a vessel, if small, into the river, should a storm be apprehended; or to Gogah, if it seem more eligible; where she will be sheltered by the reef and island of Perim. In some storms that happened late in April and early in May, several ships have been lost by remaining too long at their anchors, when the wind had veered round to the W. and prevented them from weathering Suali Point. In the heavy storm that happened on the 20th April, 1782, several large and small ships were anchored in Surat road: some parted their cables, were driven on shore, and went to pieces; others held fast but rolled away all their masts by the heavy sea; one of them completely laden for Basra, called *Fatty Bimbarack*, rolled away her masts, and foundered, when the wind had veered and was blowing hard from the land; her loss was occasioned by her labouring between the wind, tide, and high cross sea from S. and W.; excepting one Lascar all the crew of this ship perished. She was a strong vessel with a valuable cargo on board. Since 1782 no such storm has happened in April at Surat, nor even in May, although some gales have been experienced in the latter month. The approach of a gale in these months is sometimes indicated by dark cloudy weather, gloomy and black to the S.E., with lightning, and faint variable breezes, mostly from S.: with these indications a ship should ride at single anchor, in a state of preparation for severe weather, with a good fore-sail and storm stay-sails bent. Some ships lie with top-masts struck, the fore-sail and storm stay-sails being sufficient to run with over the bar or to Gogah.

Vessels detained in Surat Roads until the S.W. monsoon sets in will find it very difficult, if not impossible, to get to the S. round the foul ground off Danu or Sunjan, as a heavy swell tumbles in upon the shore, rendering it very troublesome to get an offing; and, at the commencement of the monsoon, the wind is so much from the S. She must therefore, if bound to Bombay, or any other port in the S. or E. parts of India, proceed to the N. for Gogah, where she may obtain supplies, and from thence work along the W. side of the Gulf to Goapnath Point, and afterwards to Diu Head; from the latter place she may, as before remarked, stretch off from the land, and will reach Bombay without tacking.

A ship departing from Surat Road, or when driven from it by the S.W. winds setting in strong, ought, with the last of the flood-tide, to steer about N.W., keeping in 13 or 14 fathoms until through the Sutherland Channel between Suali Bank and the head of Malaiki Banks. She should not approach Dandi Light within 7 m., to give a berth to the Gulwala Bank, which lies 6 m. to W.S.W. of that light. Surat Light should be kept about S.E., and on no account brought to the S. of a S.E. $\frac{1}{2}$ S. bearing. The same course continued, will lead her upon the hard ground to the S. of Perim Island; but the light will be the guide at night or in hazy weather. If bound to Gogah, she ought to keep along in 12 to 14 fathoms, about 2 or 3 m. distant from the island, taking care to edge away to the N. if the depths decrease considerably, the Perim Light-house being her guide. (See page 362.) When the ship is to the N. of the hard ground off Perim, or with Gogah town bearing W.N.W., she ought to haul in directly for it, and anchor in 5 to $6\frac{1}{2}$ fathoms, at L.W. abreast of Gogah town, with the light-house on Perim S. by E.; the E. point of low land by Kura village S.W. by S., and Gogah Light W. by N. $\frac{1}{2}$ N. In running for the anchorage, care is requisite not to get to the N.; for $2\frac{1}{2}$ m. E. of Gogah Creek there is a bank dry at L.W. And it must be observed that the perpendicular rise and fall of tide is 30 to 33 ft. on the springs, and that the stream flows to about 4 h. on F. and C. of moon, except when affected by N. or S. winds.

A ship, leaving Gogah Road with the ebb, must take care that the tide does not set down her

on the reef off Perim, or between that island and the main, where the tide runs usually 7 or 8, and sometimes 10 knots per hour, through a narrow gut among the rocks; but there is no safe passage for a vessel, although the island is 2 m. distant from the main land.

NAVIGATION of the GULF. Excepting the Mal Bank, and the detached shoals off its S. end, extending nearly 5 m. to the E.N.E. of Gogah, the Gulf is clear of danger across to Broach Point, but that Mal Bank now dries more to the S. than formerly, according to the testimony of native boatmen. If necessitated to leave Surat Road by strong S. winds, and not intending to run for Gogah, you may with the last of the flood, if the weather become favourable, stretch across the Gulf to the N. of the head of the Malaiki Banks for the coast about Sultanpur, where you may anchor in smooth water to the N. of the Bank abreast the river, taking care not to bring Tullijah Hill to the N. of W. $\frac{1}{4}$ N., as the Sultanpur Shoal has its N. end almost on that bearing of the Hill. The coast between Perim Island and Sultanpur Shoal is safe to approach in 8 or 9 fathoms. If enough ebb remains, or with the next ebb, a vessel may work to the S. round Goapnath Reef and Point, if circumstances permit, and afterwards to the W. along the coast to Diu.

To beat from Goapnath Point, or from Gogah, to Diu Head, after the S.W. monsoon is commenced, may not be always practicable, when the wind hangs to the S.; but a handy ship that sails well, having very good canvas and proper ground tackling for working tide work, may probably find little difficulty in doing it; for this the moonlight nights may be considered most favourable, the winds being then not so violent in general, as during the spring tides at change of moon.

A ship, being well prepared to encounter strong winds, and if bound to Bombay or other parts of India, should sail from Gogah Road at H.W., and steer round the N.E. part of the hard ground off Perim; when round it she ought to work to the S. with the ebb, and may stand in to 7 or 8 fathoms in tacking from the Katiawar shore. When Tullijah Hill is brought to bear to N. of W., a ship must keep farther from the shore, abreast the dangerous bank called Sultanpur Shoal (see page 361), nearly even with the sea at L.W. It is steep-to on the outside, having 17 fathoms about 1 m. off, and 12 fathoms close to it. From the N. end of this foul ground Goapnath Point is 9 m. distant, bearing S.W., and Tullijah Hill bears W. by N. If a ship intend to work along the Katiawar S. coast to Diu Head, a pilot for the Gulf of Cambay should be on board, who may be procured at Surat or Gogah, and he may probably be conveniently landed at Diu in passing, or carried to Bombay, as circumstances may require.

Having reached the shoal off Goapnath Point, it will be prudent to choose daylight to work through the channel between it and the N.W. extremity of the Malaiki Banks, as the soundings are no guide, the depths being 15 to 18 fathoms from side to side, and the channel scarcely 4 m. broad. In this, which is called the **Grant Channel**, between the western Malaiki Bank and the Katiawar coast, the bottom is mud, but as you approach the banks you get sand. When round the shoal off Goapnath Point, every advantage of the tides should be taken, by anchoring when they are unfavourable, and keeping near the coast in working along, observing, as noticed in the description of this coast, that the soundings give little or no warning of the approach toward the shore, there being 8 and 9 fathoms close to it in some places, and the same depth 10 or 12 m. off. When near Shalbet Island, or Jafraabad, longer tacks off shore may be made occasionally, the ship being then to the W. of the S.W. extremity of the Malaiki Banks; but it will be proper to continue to work within a reasonable distance of the coast, keeping near it till she reach Diu Head.

Having worked as far to the W. as Diu Head, stretch out from the land with the ebb tide, and if the wind incline from the W., a ship will probably get into the latitude of the entrance of Bombay Harbour, at a considerable distance from it, without tacking; but if the wind incline to the S.S.W. or S.W., it will be proper to tack occasionally to preserve the Westing; for she must by no means approach near the coast to the N. of the entrance of Bombay Harbour, whether bound into it, or to the S. along the coast of Malabar to Cape Comorin. Were she to get near the land to the N. of Bombay Harbour, it would be found very difficult, if not impossible, in bad weather, to work to the S. round the reef, against the heavy sea and N. drain of current setting along shore, especially with the flood-tide, at the beginning of the monsoon; but, well out from the land, the sea runs more regularly, and advantage can be taken to tack with favourable squalls or shifts of wind, whereby a ship will generally gain ground in working against the monsoon to the S.

In crossing the entrance of the Gulf of Cambay from Diu to Bombay, the soundings will unmistakeably tell what leeway the vessel makes (from being swept into the Gulf), as the line of 20 fathoms extends straight from Diu to the offing by Bombay, and a ship should not shoal under 20 fathoms in the S.W. monsoon (of which season alone we are now speaking) until she sights some of the Bombay land-marks, or is in the latitude of Kundari Island.

THE COAST, FROM SURAT RIVER TO BOMBAY.

The **Cambay Gulf** comprises the S. coast of Katiawar, the coasts of Surat and Broach, and part of N. Konkan, with the little Portuguese settlement of Damaon.

The coast of Guzerat, comprising the head of the Cambay Gulf, is all low and swampy. Guzerat is a very large province, which comprehends the whole dominions of the Gaikwa of Baroda, and those of his tributaries, which have an area of 41,536 square miles. This includes the peninsula of Katiawar, which has been described. The Broach and Surat coasts, with the exception of a few hills to the N. of Damaon, have no distinguishing features, and the sea shore is low and sandy, with cocoa-nut trees. N. Konkan, which has its S. limit at Choul, is on the N. separated from the Surat collectorate by the settlement of Damaon. This coast in the vicinity of, and above Bombay for 90 m., has remarkable peaks and islands, which unmistakeably point it out.

SURAT ROAD and RIVER are situated at the entrance of the Gulf of Cambay, Vaux's Tomb, on the N. entrance-point of the river, being in lat. $21^{\circ} 54' N.$, lon. $72^{\circ} 37\frac{1}{2}' E.$, near which a *fixed* light, 100 ft. high, on a column, is now exhibited, and called the Taptee Light, visible 10 m. The anchorage-ground for large ships in Surat Road is in 7 or 8 fathoms at L. W., very soft ground, with Vaux's Tomb bearing about N. by E., and False River entrance about E. Here, on the springs, the tides run very rapidly, particularly the ebb, about 5 knots per hour; but farther in, where small vessels lie near the bar, in 4 or 5 fathoms at L. W., with the Tomb about N., they do not run with equal velocity. Proper directions cannot be given for a stranger to proceed over the bar into Surat River, because the sands are continually changing, by which new channels open, and the old ones are shut up. Formerly, that called Domus Channel was the deepest, and generally used by ships; it took a direction on the E. side of the banks, towards the village Domus, on the E. shore; but it is now filled up, being only navigable by boats at half-tide. The proper channel over the bar at present can only be pointed out by a native pilot. The distance from the bar to the city of Surat is about 5 leagues; nearly two-thirds of the distance there is a continued chain of banks, many of them dry at half-tide, with very small depths at L. W. in the channels between them. Above Omrah, and near the city, the river is more contracted, with deeper water. The total length of Tapti river, from its source in the Sangor and Nerbudda territories, is 440 m.; of course, in the rainy season, the freshets must be very heavy, and interfere with the tides at the river mouth. The Tapti is said to be fordable abreast of Surat, when the tide is out; but, with a rise of 3 or 4 fathoms, vessels of considerable size can be taken up there, towards H. W. Surat Castle is in lat. $21^{\circ} 12' N.$, lon. $72^{\circ} 48' E.$

Tides. In the road, it is H. W. on F. and C. of the moon about 4 o'clock; springs rise 19 ft.

Light. Tapti Light, in lat. $21^{\circ} 5' N.$, lon. $72^{\circ} 38' E.$, is a *fixed* light, about 100 ft. above H. W., on a column having three bands of red and white; it is a few yards from Vaux's Tomb.

Nosari, or Nowsaree River, bears from Tapti Light S.E. by S. 12 m., and from Gundavee River about N.N.W., distant $3\frac{1}{2}$ leagues; it is wide at the entrance, but difficult of access, on account of the winding channel among the banks, which has generally 3 or 4 ft. in it at L. W. spring tides. A small vessel could enter many years ago, by bringing a round bushy tree on the S. side the entrance to bear E.N.E., but recent surveys show great alterations, and the smallest vessel should not try to enter without a pilot. Between Nowsaree and Surat Rivers, there is another called Sucheem or False River. These rivers are only frequented by boats and small vessels, and their channels, by the shifting of the sands, are liable to alter; it may therefore seem of little utility to notice them. **Bibi Ajani Tomb**, with conspicuous white dome, stands about $2\frac{1}{2}$ m. to the S.E. of Nosari River entrance.

Gundavee River is distant 24 m. to the S.S.E. $\frac{1}{2}$ E. of Tapti Light, and 8 m. N. by W. from Bulsaur River, having a bar $1\frac{1}{2}$ m. from the entrance, with 3 and 4 ft. on it at L. W. To get into it, bring two palm-trees, called Mendhur Trees, to bear E.N.E., then steer over the bar with this bearing, for the shore to the N. of the entrance, taking care to avoid the N. end of the S. sand, on which fishing-stakes are sometimes placed. When a flat bush, resembling the top of a barn, is brought to bear S. by E., steer for it, and anchor close within the S. point of the river, or outside of the entrance close to the N. shore. H. W. at $2\frac{1}{2}$ h. on F. and C. of moon: the rise of tide 22 ft.

BALSAR, or BULSAUR RIVER, is distant 8 m. below Gundavi, in lat. $20^{\circ} 37\frac{1}{2}' N.$, lon. $72^{\circ} 52' E.$, having 2 or 3 ft. on the bar at L. W. spring tides, the rise about 22 ft. perpendicular, and flows to 2 h., on F. and C. of moon. A vessel proceeding into this river used to bring the N. tree on the S. bank, or Grove of Cossumba, to bear E. by S. in one with the S. point of the

entrance, and then steered directly for it with safety.* Outside the bar, about $3\frac{1}{2}$ m. from it, there is a rocky bank with 6 ft. on it at L. W.; and inside between them, 12 to 3 ft. soft ground. In the river there are 7, 8, and 9 ft. at L. W.

OMERSARI RIVER is 8 m. from Damaun, and 6 m. to the S. of Balsar, having a dry bar at three-quarters ebb; a small vessel bound into this river, should bring a high white building inland at Pardee, to bear E.S.E., then steer in with the entrance of the river open; when Parnera, or Panella Hill bears E. by N., she will be inside the bar, and in the entrance of the river she may anchor, when the land to the N. is shut in with the point on the same side. About $4\frac{1}{2}$ m. to the W. by S. of the river is a shoal of 10 ft., amongst soundings of 18 ft.

DAMAON, Damaun, or Daman, belonging to the Portuguese, in lat. $20^{\circ} 24\frac{1}{2}'$ N., lon. $72^{\circ} 49'$ E., is known by two square steeples and the white appearance of the buildings, also by a hill to the N., composed of four hummocks, called Damaon Hills, on the highest part of which, elevated 420 ft. above the sea, is an Idgah, or Mohamedan place for prayer. Rather more than $\frac{1}{4}$ m. N. of Damaon, there are three brab trees close together on the low shore. On either side of the river there is a fort. Indaghur Fort, on the S. side of the river, on a hill 3 m. distant, is another mark to know this place. Provisions and vegetables are cheap and plentiful; it is an excellent place for small vessels to remain during the S.W. monsoon, or to receive repairs if needful, the country being well stocked with ship timber. Many ships, from 500 to 900 tons burden, have been built in this river; between 1790 and 1818 there were thirty-four ships built at Damaon, of which several were of 700 to 900 tons. Damaon has been in the possession of the Portuguese since the year 1581. A few grabs, which class of vessel is now going out of date at Bombay, still belong to this port; they trade to Mozambique and other African ports.

Anchorage. Ships may anchor in Damaon Road in 6 fathoms L. W., with the river open, bearing E.; Parnera Hill about N.E.; and Indaghur E.S.E.; off the town about 4 m.; remembering that the rise of tide is 3 fathoms at springs, and nearly 2 fathoms at neaps. The depth at L. W. spring tide is 2 ft. on the bar, and 18 or 20 ft. inside, between the forts at the town, where the bottom is soft mud. The bar is very flat, mostly hard sand, except from the N. point of the river, where rocky ground projects a great way out.

Tides. There is never less, at common springs, than 3 fathoms at H. W. on the bar; the rise of tide being 17 or 18 ft.; and it flows to about $1\frac{1}{2}$ h. on F. and C. of moon; but, in the offing, the flood-stream continues till $2\frac{1}{2}$ h.

Directions. Vessels of considerable size, up to 500 tons, sometimes go into this river at H. W., in fine weather, and moor abreast the forts. To enter the river, keep the entrance open, bearing E., and steer for it, or keep the first round hill, a separate hill to the N. of Indaghur, nearly in line with the church tower, or between the tower and flag-staff of the S. fort, till the three brab trees are open to the left or N.W. of the Idgah Hill, when you are on the bar. Then steer direct for the S. part of the N. fort, which is called St. Jeronimo, and anchor as nearly in mid-channel between the forts as you can. It is not advisable to attempt running in without a pilot, unless the vessel is in distress; for the channel is extremely narrow, and the sand-banks shift every monsoon. At L. W. springs there is only a depth of 1 ft. of water on the bar, and that in a very minute channel, merely a thread, so as to be impracticable for ships' boats.

The rivers of the North Konkan, above Bombay, which are described in this chapter, are only frequented by boats and small vessels, and by the shifting of the sands their channels are liable to alter; it may therefore seem of little utility to notice them so particularly; but it may sometimes happen that a storm will overtake a ship on this part of the coast, and force her to run for the nearest river, to prevent her being driven and lost on the shore reefs. If running in is attempted, it ought to be near H. W., to afford a chance of succeeding. Damaon River is the safest and most favourable for such purposes. The *Hornby*, of 700 tons burthen, and other smaller ships, were saved by running at the last extremity into this river, when encountered by sudden storms, on departing from Surat Road in the month of May.

The Malaiiki Banks. The S. extremity of these Banks (fully described at page 366), which choke the entrance of the Gulf of Cambay, has 5 to 7 fathoms, *abreast of*, that is to say, in the latitude of Damaon, distant about 26 m. Another little narrow bank, having 7 fathoms water, and being 7 m. in length N. and S., has been found at the distance of 15 m. N.W. of Damaon. The Government pilot at Damaon gave the following account of a shoal, to the officers surveying that coast in 1854, but search proved fruitless. The pilot's statement was to the following effect:—

"Some seventeen years ago (*i.e.* about 1837), when piloting a vessel from Goa to Damaon, they were at noon by observation in lat. $20^{\circ} 15'$ N., with Sunjan high land bearing E. $\frac{1}{4}$ S., and in 18

* No vessel should attempt to enter any of these rivers without a pilot.

or 19 fathoms. They stood to the E. during the afternoon with a light wind, and about 3 h. p.m. got a cast of 4 fathoms, the previous casts being 12 and 14; they immediately went round and had only $2\frac{1}{2}$ fathoms, the tide at this time being half flood."

The fishermen, it is said, frequently strike on the Bank, which is of sand, and very small in dimensions. No other bearings of the land are given by which its position may be determined, but the pilot knows they had from 12 to 14 fathoms water inshore of the Bank. The above Bank may exist at the very southern extreme of the eastern Malaiki Banks.

UMERGAOM, or **Omergaum**, has a ruined tower on the S. of the river, in lat. $20^{\circ} 12\frac{1}{2}'$ N. Indaghur Hill is 3 m. S. by E. of Damaon Fort, and 17 m. N. of Sunjan high land. Between Omergam and Damaon the foul ground does not extend 3 m. off the land, which is low, with bushes and with two indentations, where are situated the little creeks of Maruli and Kauli; the former lying 2 m. W.N.W. of Pyramid Hill; the latter about the same distance and bearing from Indaghur.

Gulur Point, about half way between Umergaom and Danoo, is low, with cocoa-nut trees: and foul ground extends off it for nearly 4 m.

The High Land of Sunjan or St. John, 1760 ft. high, $2\frac{1}{2}$ leagues inland, has a round mount in the centre, in lat. $20^{\circ} 4' N$, and on the meridian of Bombay Castle; the foul ground off the coast abreast being 14 m. to the W. of the same meridian.

DANOO or **DANU FORT**, in lat. $19^{\circ} 58' N$, lon. $72^{\circ} 48' E$. is on the N. side of the river; shoal ground extends nearly 2 leagues off shore to the W., some parts are nearly dry; H. W. on F. and C. at 1 p.m., rise at springs about 20 ft., the shoal ground extends to the N. as far as Damaon, from 2 to 4 m. off shore. Small coasters find anchorage in 3 or 4 fathoms within the outer reefs off Danoo, about 4 m. to W. of the fort. The creek can be entered at H. W. only; good fresh water may be had close to the banks. There is an export trade in small timber and bamboos.

Foul Ground of Danu. An extensive reef, with rocky ground, fronts this part of the coast, projecting from it 7 or 8 miles, abreast the high land, and stretching from Danu River a little N. of Tarapur nearly to Damaon, a distance of 28 or 30 m. When the body of the high land of Sunjan is brought to bear E.N.E., a ship is then approaching the S. part of the foul ground, and ought not to come under 12 or 13 fathoms, for the rocky bottom reaches that depth out in some places. With the body of the high land bearing from E.N.E. to E.S.E., a large vessel ought not to come under 15 fathoms, towards the verge of the foul ground; for she is liable to lose her anchors among rocks, if drifted on the edge of the reef during a calm, and obliged to anchor where the tide runs strong in eddies.

When the body of the high land of Sunjan is brought to bear E.S.E., a ship is to the N. of the extremity of the foul ground, and may stand in to 10 or 11 fathoms before tacking from the shore; but not closer than 10 fathoms till nearly abreast of Damaon, for the coast continues rocky as far out as 8 or 9 fathoms, until that place is approached. When round the foul ground of Sunjan, a ship should steer to the N.E. to get near the coast; in working, she may stand in to 10 or 11 fathoms, and off to 18 or 20 fathoms; but, in standing far over to the N.W., if she begin to shoal on the S. part of the Malaiki Banks, it will be prudent to tack, and stretch over towards the coast, and then keep within a moderate distance of it in proceeding towards Surat Road.

The Hills about this part of the coast commence about 4 m. from the shore; at first small and detached, gradually increasing in size, and becoming more connected to the E., and forming, at the distance of 5 m., a continuous chain of low hills, running parallel with the coast, with much wood on some, whilst others are quite bare. **Kaldrug**, or the Peak of Tarapur, situated 12 m. to the S.E. of the town, and a little inland, resembles a castle when seen from the N.W., being composed of rugged rocks upon the summit of a hill 1,550 ft. high; and there is a very sharp pyramid, called Valentine Peak, about 15 m. farther to the N.; and about midway between them is Allung Hill, or Asiri. Both to the N. and S. of Kaldrug there is a remarkable peak at the distance of 4 m.

Mahaluxmi, or **Valentine's Peak**, 1,540 ft. above the sea, is rather a sharp peak, bearing E.N.E. from Tarapur Point, distant 16 or 17 m. **The High Land of Sunjan**, commonly called St. John, is to the N.W. of Mahaluxmi; its highest part, 1,760 ft. above the sea, bears N.E. by N. from Tarapur Point, 17 m.; and from the outermost foul ground off Danu it bears E.N.E., about 15 m. off. Sunjan High Land commences to rise at 3 m. from the sea shore, and has a regular appearance, sloping to the N. and S. from the centre, which is a round mount, and is the part always set for the body of the high land, which may be seen in clear weather 40 m.

TERRAPUR, or **TARAPUR POINT**, is 9 m. to the S. of Danoo, and bears N. by W. from Arnol Island, distant 22 m.; between them the coast is rocky, and not to be approached nearer than 8 fathoms, for the foul ground projects from Tarapur Point nearly to that depth. On the N. side of it, the town and bay of Tarapur are situated; there is an anchorage for small craft to the N.W. of the town, within a rocky barrier reef, but the bottom is mostly rocky, particularly in the

S. part of the bay, which is full of rocks and shoals, extending from the Point to the N.W. and N., abreast the town. **Tarapur Town**, on the S. side of the creek, has the remains of a Portuguese fort, bearing the date of 1593. Chichun town, on the N. side of the creek, has a custom house and traveller's bungalow. The sea coast is low and densely wooded. **Wudwan Point** is a little, low point, with mangrove bushes, 6 m. to the N. of Tarapur Point. The most dangerous part of the Sunjan, or Danu reef, lies 5 m. to the N.W. of Wudwan Point.

The Coast between Danu and Arnol Island is low, and much overflowed by high spring tides; but, at an average distance of 7 m. from the sea, there stands the high land of Tarapur and Mehim, a fine chain of hills, in parts wooded, in parts barren, with several conspicuous summits. The low coast is thickly fronted with brab and date trees, both which are cultivated for toddy; the date tree produces fruit, but of inferior size and quality. The soil throughout is very poor, and unfit for the cultivation of anything but rice, of which a single crop only is produced during the year. The whole coast, being fronted by a dry rocky reef, is without a single harbour or anchorage for any but the small coasting craft. The coast fronting the sea between Tarapur and Basseen is generally low and covered with trees. Between Tarapur and Bombay the tides set nearly in the direction of the land; the flood a little towards it, or N., and the ebb a little from it, about S. by W.

USSAPUR ROCK is high, detached from the main land at H. W., and forms the N. extreme of Angasi Bay, being 4 m. to the N. of Arnol Island. At L. W. the rocks dry to a distance of $\frac{1}{2}$ m. outside of it, and extend thus far out, right across the Bay, to Arnold Island. **Kilwa Mehim** is a village on a little creek $3\frac{1}{2}$ m. to N. of Ussapur, having a little detached rock fort outside. Mehim is a town $2\frac{1}{2}$ m. farther N. Off this part of the coast the rocks are very extensive, one patch of 3 fathoms lying 4 m. W. of the latter town; and the coast reef, that partly dries at L. W., extends off shore more than half that distance. Sirigom, a village midway between Ussapur Rock and Tarapur Point, has an old Portuguese fort; and Satputti-kari, a small creek, lies 2 m. N. of it.

ARNOL ISLAND, which is nearly 1 m. distant from the main, and 4 m. to the S. of Ussapur Rock, bears from Pos Pir N. by W. $\frac{1}{2}$ W., distant $7\frac{1}{2}$ m.; it has a little fort on it. Between Arnol Island and Basseen the distance is about 9 m.; the shore is rocky, and should not be approached under 8 fathoms by a large vessel. The high land of Basseen, and its separate peak, are conspicuous land-marks; but the part that fronts the sea (on which Basseen town stands) is very low and marshy, forming at H. W. an island, as it is cut off by a creek from Basseen River to Vaterna River. Out of this low land stands up the old fort of Wujurgurh on a little hill, which is 4 m. N. of Deravi Fort, and rather conspicuous in hazy weather. Between Basseen and Kalapura, a town on the main low land abreast of Arnol Island, the coast is very low, though the mountains to the E. are so high.

There is only a narrow channel between Arnol and the main: the island is surrounded by rocks. To the N. of it is Angasi Bay, a deep bight, the mouth of the Vaterna River, but this is full of shoals, and only navigable by boats or small vessels towards H. W. The channel into the river is between Arnol and the main, for a reef of rocks extends right across the mouth of Angasi Bay.

BASSEEN RIVER, about $7\frac{1}{2}$ m. to the S. of Arnol Island, and 10 m. to the N. of Versovah, has shoal water a good way off its mouth. Large vessels might enter at H. W., but it is only used by coasters now. **Basseen Town**, now a decayed place, was once of importance to the Portuguese. It is situated on an island separated by a narrow channel from the main land of the North Konkan. This island of Basseen is about 10 m. in length from S E. to N.W., and 3 in breadth. It has an irregular surface, with some hills of considerable elevation; one a very high hill of table form, and S. of that stands the conical hill, called Basseen Peak.

Puspear, or Pos Peer Rock, in lat. $19^{\circ} 20' N.$ lon., $72^{\circ} 45' E.$, on which is a Mahomedan saint's tomb, lies at the N. side of Basseen River entrance, 1 m. from shore, and $2\frac{1}{2}$ m. to the N.W. of Deravi Fort. To the N.W. of Pos Peer a reef extends from it nearly 2 m. As this river entrance has never been properly surveyed, no vessel should attempt to enter without a good pilot.

Basseen Peak, or Kamundrug, 10 m. E.N.E. of the river entrance, is 2,160 ft. above the sea, with a great level piece of land of equal height to the N. of it. These hills, with the high land of Salsette, and the Neat's Tongue, will unmistakeably show when a vessel is to the N. of Bombay.

The fishing-stakes are placed a great way out, and ought to be avoided in the night by vessels working along shore. Both to the N. and S. of Bombay, off Mehim, Versovah, Basseen, Choul, they are sometimes placed as far out as 8 or 9 fathoms water; they are laid down by the fishermen at the beginning of the fair season, and taken up before the S.W. monsoon sets in. This is done by pressure, as they are forced into the ground on the falling tide by boats affixed to them; and dragged out of it in the same manner with the flood. Each stake is valued at 50 or 60 rupees; therefore persons should be careful not to destroy the labour of these industrious fishermen.

SALSETTE ISLAND is a large island to the N. of Bombay. Its S. point is at Bandora, and thence it extends for 16 m. to the N., where the Basseen inlet bounds it. The sea face of Salsette

is fronted by several islands, large and small; the N.-most one, called Deravi, is largest and highest, being 300 ft high at its N. end, and it is 7 m. in length, N. and S., or parallel to the coast line. Versovah Island is to the S. of Deravi; the passage between them was formerly called the River Murwa.

Versovah Fort, in lat. $19^{\circ} 7' N.$, lon. $72^{\circ} 46' E.$, at the S. end of the island of that name, is about 12 m. due N. of Malabar Point. Vessels coasting between them should not come under 8 fathoms at H. W., or 6 fathoms at L. W., as the bottom is rocky under 5 fathoms. The high land of Salsette bears N.E. by E. from Versovah Fort. **Versovah Rock** lies 1 m. to W. of the fort, and there is another shoal, with 2 ft. at L. W., about 1 m. to S.W. of the fort.

The high land of Salsette, on the large island of that name, which is N. of Tromba, and extends 16 m. to the N. of Mahim, has several remarkable peaks; the central and highest, called Tannah Peak, being 1,530 ft. high, a flat-topped hill when viewed from the W., and standing 9 m. S.E. from the entrance of Basseen River, which flows round the N. and E. sides of Salsette Island to Tannah Town, and has considerable depth at H. W. The N. high peak of Salsette is a detached sharp peak, also 1,500 ft. above the sea. When viewed from the S.W., these high peaks of Salsette are closed together, so as to have the appearance of one central summit.

MAHIM BAY, at the S. extremity of the island of Salsette, is formed by Worli Point (the N.W. point of Bombay Island) on the S. and Bandra Point on the N., the latter bearing N. by E., 6 m. from Malabar Point. Bandra, or Bandora Church, near the summit of the point, is 120 ft. above the sea. Since the construction of the Mahim and Sion Causeways, the bay of Mahim is much filled up, and is now only a refuge for fishing-boats. Small coasters find scanty shelter from N.-Westers under Bandra Point, but no ships should shoal under 5 fathoms by day, and 7 by night, in working up this coast; and let it be remembered that the rise of tides at springs averages $2\frac{1}{2}$ fathoms, the least rise of neaps being $1\frac{1}{2}$ fathoms. The **Neat's Tongue**, or high land of Tromba, is 6 m. E. of Mahim Bay.

MALABAR POINT, or Walkeshwur, which is 3 m. N.N.W. of Bombay Light-house, is high, and a conspicuous mark to a vessel coming from the N. Its highest part, more than a mile N.E. of the flag-staff, has houses and brab-trees, which are visible more than 15 m. in clear weather.

GENERAL DIRECTIONS. From Bombay to the N. A ship should leave the harbour towards the latter part of the ebb, that she may get to the W. of the reefs off Bombay by the time the flood makes, which will then be with her in proceeding to the N. She should keep Kundari Island clear to seaward of the Outer Light-ship, so long as in sight from aloft, to avoid the Prongs, and the rocky ground off Malabar Point. The coast from Bombay to Tarapur may be approached by a large ship into 8 fathoms in fine weather, and in some parts into 6 or 7 fathoms; the bottom is frequently rocky between Tarapur and Damaon. The foul ground of Sunjan, off Danoo, extends a great way, and should not be approached nearer than 12 or 13 fathoms, for within these depths there are overfalls in some places, the bottom rocky, and unfit for anchorage. When abreast of Damaon, and from thence to Surat (except off Bulsar, where there is a patch of 20 ft. in 5 or 6 fathoms water), the coast may be approached to 5 or 6 fathoms, at L. W.; but, in standing to the W., a ship ought not to deepen above 19 or 20 fathoms towards the Malaiki Banks. When within 10 m. of Surat Road, it is proper to keep in 8, 9, and 10 fathoms, taking care not to stand off above 5 or 6 m.

With a contrary wind ships working between Bombay and Surat, to benefit by the tide, must not stand far from the coast, but work within 10 or 12 m. of it. They will be obliged to anchor when the tide is against them, except on the neaps. A ship that sails well may sometimes hold her own, by stretching well out in the offing, and taking advantage of any favourable slants of wind which may happen.

Bombay old Light-house, on Colaba Point, stands 3 m. to S.S.E. of Malabar Point; off the latter the foul ground of Back Bay extends fully 2 m. to the S.W., and joins to the S.W. Prong. Then comes the entrance to Bombay Harbour; and beyond it, at the distance of 11 m. due S. of the old light-house, stands **Kundari or Kenery Island**, with a new light-house which is described further on. (See page 376).

SOUNDINGS. Between Kundari and the main are several rocky patches; and to the W. of the island the water is shoal to a considerable distance, but free from dangers. Over this Kundari mud flat a heavy ground swell rises, in the S.W. monsoon, liable to make ships labour very much.

THE APPROACHES TO BOMBAY HARBOUR.

Direction Bank, about 30 m. to S.W. of Kundari Island, is a good guide, which has on it from 22 to 28 fathoms, coarse sand and small shells, with 30 and 32 fathoms, mud, within it. Its

greatest length is about 20 m. in a N.N.W. and S.S.E. direction; it lies between lat. $18^{\circ} 8' N.$ and $18^{\circ} 28' N.$, and between lon. $72^{\circ} 13' E.$ and $72^{\circ} 26' E.$ In approaching and crossing over this bank from the W., you pass over 30 or 40 m. of the Fifty-fathoms Flat, then gradually shoal to 40 fathoms, then suddenly to 30 and 23 fathoms on the Direction Bank; after which the water deepens again to over 30 fathoms between this bank's N. extreme and Kundari Island, or to rather less than 30 fathoms inshore of the S. end of the bank.

When running for Bombay Harbour on about a N.E. course, if the vessel is to the S. of the latitude of the Direction Bank, you rapidly shoal from 40 to 30 fathoms, and then take a long time to get into 20 fathoms, which depth is about 17 m. from the land.

On the contrary, if the vessel is to the N. of the Direction Bank, you take a long time in changing the depth of water from 40 to 30 fathoms, but then rapidly shoal to 20 fathoms, which depth at L. W. is about 15 m. to seaward of Kundari Island or the Outer Light-vessel.

The Fifty-fathoms Flat. This is a great flat, extending over a space of 50 m. of longitude and 20 m. of latitude—between the same parallels as, and commencing 20 m. to the W. of, and extending till 70 m. to the W. of Direction Bank—on which will be found from 48 to 50 fathoms, fine sand, although occasional casts of muddy bottom are found in the space which connects the two banks. But to the S.W. of Direction Bank the bottom is more uneven, having overfalls from 50 to 55 fathoms, and occasional casts of mud as well as sand. On the parallel of Kundari, when within 80 m. of that island, the soundings are 50 fathoms, and decrease very regularly in steering to the E.; but in about the meridian of the S. point of Katiawar, and 110 m. due W. of Kundari, there are shoal patches of 38 and 43 amongst the general soundings of 50 fathoms.

Approaching Bombay Harbour. During the fine season, from Nov. to Feb., when land-winds prevail during the night, lasting till 10 h. in the forenoon, and sometimes till noon, a ship approaching Bombay Harbour from the S. should have hugged the coast all the way, taking care of the fishing-stakes, which lie out in so much as 8 fathoms at L. W. Off Bankut the influence of the tides is felt, when a vessel is approaching Bombay from the S. But to the N. of that place towards the Gulf of Cambay, they attain to greater strength, and it must be remembered that they will sensibly help or retard a vessel. It is useless to work with a lee tide.

From March till the S.W. monsoon begins in the end of May, or early in June, and again (after the rainy season) in the month of Oct., the winds off this coast are principally N.W., veering to W.N.W. or W. from the forenoon towards sunset, then N.W. till midnight, and to N.N.W. or N. from midnight till the forenoon.

In the S.W. monsoon, a ship steering for Bombay Harbour, from mid-May to Aug., may sometimes have steady gales and clear weather until she gets within 25 or 30 leagues of the coast; but cloudy weather with rain and squalls may be expected on the bank of soundings, as she advances near the land. In June and July, more particularly when the S.W. monsoon blows in full force, such weather is frequently experienced, precluding observations; she ought therefore to have good topsails and courses bent, that she may haul off and keep at a reasonable distance from the land, in case dark blowing weather should prevent the latitude from being correctly ascertained. For, in dark stormy weather, it would be imprudent to run for the harbour, if the latitude is not obtained by observation of sun, moon, or stars; unless she has good charts and her commander has confidence in navigating by the soundings alone as recommended by Captain Selby of the Indian Navy, who well surveyed the bank of soundings.

Method of navigating by Soundings.—Draw a straight line on the chart from Zyghur River to Dwarka temple; this will pass through Direction Bank; and you will perceive that from the N.W. end of that bank (which has 40 fathoms close to) the line of 40 fathoms runs straight for 100 m. till within 50 m. to S. of Diu Head. The line of fifty fathoms soundings lies fully 60 m. outside of this. Thus there is an immense plateau of soundings abreast of Bombay, in crossing which the fastest sailer will be several hours in shoaling the water from 60 to 50 fathoms. Therefore, when 120 m. to the W. of Bombay Harbour, the officer of the watch should cast the deep sea lead and begin carefully to log the soundings, courses steered, &c. Thus, after a run of some 80 or 90 m., having taken and noted down a careful series of soundings, together with the times, courses, and distances run, the navigator is enabled to project his track, with the ascertained depths at their proper intervals, on a piece of tracing paper, on a similar scale to that of his chart. By moving about this transparent paper over the chart, carefully preserving his meridian, until the coincidence of the depths on the two is apparent, he cannot fail to recognize both the ground he has gone over and his present position, when he may boldly stand on. If likely to cross the Direction Bank, let him notice our remarks under that head.

When a ship has obtained soundings in the S.W. monsoon on the edge of the bank, large snakes will be perceived if a look-out is kept for them; these diminish in size as the depths on the

banks decrease, in running towards the land. If not exactly certain of the latitude, it will be prudent to keep in from $18^{\circ} 15'$ to $18^{\circ} 25'$ N. latitude, and endeavour to get soundings on Direction bank, after passing over that extensive flat to the westward of it, which has such regular soundings over an area of 1,000 square miles; the average depth being 50 fathoms, and not varying in depth 2 fathoms, either more or less; it has therefore been called the Fifty-fathoms flat.

During the early part and strength of the S.W. monsoon, great care must be observed not to get to the N.-ward of the entrance of the harbour, for then the current of the flood-tide, as well as the heave of the S. swell, acting upon a vessel, (occasionally stopping or heaving to for the purpose of sounding,) frequently set ships along the bank toward the Gulf of Cambay; and if a ship get to the N.-ward of the harbour, late in May, June, and July, she may find it very difficult at times, if not impossible, to work round the S.W. Prong. By getting to the N.-ward of the harbour in June several ships have been driven on shore in Back bay. The *Shah Byramgore*, in a heavy gale that set in after she had worked out of the harbour, was forced to the N.-ward of it, driven on the rocks near Versovah, where most of the crew perished, and the ship was wrecked. Several ships have been lost to the N. of Bombay, and others have been in distress, and with great exertions got round the S.W. prong into the harbour. An American ship bound to Bengal, many years ago, had a narrow escape; she fell in with the high land of St. John, to the N. of Bombay, when by *dead reckoning* near Point Palmiras, in the Bay of Bengal. This happened when the S.W. monsoon was blowing strong, late in June. Being a fast-sailing ship, she cleared the shore under a pressure of canvas, passed Bombay, stood to the S.-ward, and arrived safe at Madras.

Therefore, in these months, a ship should steer direct for Kenery or Kundari Island, allowing for a northerly set on the flood-tide—though an examination of many ships' logs shows that the prevailing set of ocean current outside the depth of 30 fathoms off the harbour, after the first burst of the monsoon is to the S.-ward—and endeavour to make the island bearing between E. and S.E., taking care to borrow a little either way, as prudence may dictate and circumstances require, to carry a fair wind in entering the harbour. If the wind incline to blow in squalls from W. or W.N.W., take care not to run too close in with the land to the S.-ward of Kundari Island, nor even approach that island too near, on account of the flat which extends 4 or 5 m. W.-ward of it, as there might be difficulty in weathering it with these winds, which are sometimes experienced in June and July, but more expected in August.

In Aug. and Sept. the squalls come mostly from W. and W.N.W., and the freshes from the rivers and gulf of Cambay set to the S.-ward; it is therefore not so dangerous, at this late period of the season, to get to the N.-ward of the entrance of the harbour, although it is still prudent to fall in with Kundari Island bearing but little to the S.-ward of E., that no time be lost in entering the harbour. The new light on Kenery is visible 20 m. off.

It has been observed at Bombay that the first stormy weather of the S.W. monsoon seldom comes with the full moon springs, but generally during the dark nights. Although S. winds prevail after the middle of May, the stormy weather and rain usually do not set in until the dark nights, some time between the 4th and 15th of June. From the 8th of this month to the 15th or 20th of July, the weather is generally most unsettled and severe; hard squalls, much rain, and dark cloudy weather, may then be frequently expected in the vicinity of Bombay harbour.

BOMBAY HARBOUR* is very capacious, being 12 or 14 m. long from N. to S., with a general width of from 4 to 6 m. Its shores are irregular, and indented by numerous bays and inlets, and it contains several islands and banks. The usual anchorage is on the W. side of the harbour, off the town of Bombay, which stands on the S.E. point of Bombay Island. The town of Bombay is well fortified. Being essentially a commercial port its population varies considerably, and consists of Persians, Arabs, Sidees, Mahrattas, Carnatas, Indo-Portuguese from Goa, and a great number of sailors of all nations; the population is more than half-a-million souls. The Docks, which were built by the late E. I. C., are under the management of Parsees, by whom the shipbuilding is conducted. The ships built at Bombay include merchant vessels of very large tonnage, occasionally frigates, and even ships of the line, the timber being amply supplied from the neighbouring districts of Malabar and Guzerat.

Colaba Island, which forms the N. entrance point of the harbour, is low, with a small elevation at the S. end on which the light-house stands, bearing S.W. by S. from Bombay Castle, distant $2\frac{1}{2}$ m. The Observatory (where a time-ball is dropped at 1 p.m.) is to N.W. of the light-house. What was Colaba Island is now part of Bombay Island, being joined to it by a substantial causeway, or velard; the land on the N. side of which (between the two large blocks of houses on the Arthur Pier, called Grant's Buildings, and the cooperage on Mendin's Point at the S. end of

* See Chart :—Bombay Harbour, by Whish, No. 2,621; scale, $m = 1.5$ inches.

the esplanade) is being rapidly filled in. That part by the light-house is Bara Colaba, the other half is Chota Colaba. Houses and patches of trees connect the light-house point with the fort of Bombay. The northern extreme of Colaba is formed by Grant's Buildings, two large blocks of warehouses on the Arthur bund, the head of which is the N.E. point of Colaba, Jamsetji bund being situated 2 cables to the S.W. of it, nearly abreast of the Dolphin beacon.

Oyster Rock, formerly having a white beacon, 24 ft. high, but now built up as a battery, lies 1 m. E.N.E. from the old light-house, and 1 m. N.N.W. from the inner light-vessel.

HIGH LAND ON THE S. SIDE OF BOMBAY, and the several islands lying within its harbour, most unmistakeably point it out in the daytime.

Kundari Island, or Kenery, is in lat. $18^{\circ} 42' N.$, lon. $72^{\circ} 48' E.$, or on the meridian of Bombay light-house, from which it is distant 11 m. It is surrounded by a high wall, is well wooded, and has two mounds, the southernmost of which, slightly the highest, is 120 ft. above the sea. Kundari lies $2\frac{1}{2}$ m. from the main land, and $1\frac{1}{4}$ m. to seaward of its sister island, Unari, or Henery, which is very low, with ruined fortifications and a few palm trees. The channel between these two islands is only available for small coasters. Kundari island is just discernible at L. W. from the decks of ships in Bombay harbour, 13 m. off; so that it may be said to be first visible from a distance of 12 m. in very clear weather; but, having the high land of Thull behind it was not easily perceived from a ship's deck from seaward till within 10 m., until the new light-tower over a broad house (75 ft. above the island) was erected.

KENERY LIGHT, a fixed light, of the first order, elevated 160 ft. above H. W. level, and visible 20 m., has recently been placed on an octagonal tower rising on the centre of a flat-roofed house on Kenery Island. A flag-staff, with a yard 200 ft. above sea, stands to N.E. of the light-tower.

The High Land of Thull, N.E. of Kundari island, is more than 1,000 ft. high in its southern part, and is separated by a low ridge from the hill of Ramdhurna, or tree peak. On its northern declivity there are, near each other, two small hummocks, called the Paps. **The Paps**, bearing from Thull Knob S.E. by E. $\frac{1}{4}$ E. $3\frac{1}{4}$ m., though not very conspicuous to a stranger, are an excellent mark for pilots. **Thull Knob**, a useful mark, in thick weather, for avoiding the dangers at the entrance of the harbour, bearing S.E. $\frac{3}{4}$ S. nearly 7 m. from the light-house, is a round hill on the N. point of Thull, 160 ft. high, with a tree on its summit, which distinguishes it from a similar little hill of rather less elevation a little further to the S. and W.-ward, and called False Knob. In thick weather these little hills stand out well amongst the cocoa-nut trees, being detached from the more distant highland. **Gull Island**, or Kasoa, is a little rocky islet at the entrance of Penn River, and rather more than 2 m. N.N.E. of Thull Knob.

Great Caranja is a large isolated hog-backed hill, about 700 ft. high, with a steep declivity at each end, called the N. and S. brows; the latter is steepest, and 4 m. N.E. of Thull Knob.

Little Caranja hill, about 2 m. N.N.W. of the great hill, has an irregular outline, with a mosque on the N. end of its summit which is 690 ft. high. Both these hills stand surrounded by cocoa-nut trees on the low and woody island of Woorun, or Caranja, or Carija, the sea face of which is 4 m. long on the E. side of the harbour. **Funnel Hill**, or Kurnali, a remarkable peak resembling a chimney, 10 m. to the E.-ward of Caranja, is a good pilot mark in clear weather.

Elephanta Island, or Garapori, high and densely wooded, and having two peaks which are in one when viewed from the anchorage of Bombay, lies 4 m. to the N.-ward of Little Caranja, and bears E.N.E. $5\frac{1}{4}$ m. from Bombay Castle. **Butcher's Island**, or Derdiwi, a small low island, with a tower in the centre, and a large tree near its S.E. end, is situated rather more than 1 m. to the W. of Elephanta, or 4 m. N.E. by E. $\frac{1}{4}$ E. from Bombay castle flag-staff.

The above are all the useful marks on the E. side and middle of the harbour.

THE MARKS on the W. and N. sides of Bombay harbour are as follows. **Malabar Hill** is about 160 ft. high, having a regular oblong appearance, sloping a little towards the sea, and covered with houses and trees; at the point is one of the Governor's houses with a signal-post and flag-staff. The deep bay between Malabar hill and the light-house is called Back Bay. In the town the Cathedral has a square tower, the Scotch Kirk a tapering white spire. **The N.E. Bastion** of Bombay castle is the most prominent angle of the works towards the harbour. When abreast of the Sunken Rock shoal, coming up the harbour, this bastion is not easily distinguished from the wall of Fort George, which is on higher ground a little farther N.-ward.

Cross Island, or Gibbet Island, is small, formerly resembling a hay-cock, but now cut down for a battery, and lies about $1\frac{1}{4}$ m. to the N.-ward of the anchorage off the town, and $\frac{1}{4}$ m. from the nearest part of the shore. A shoal projects nearly $\frac{1}{4}$ m. from it to the S.W.; but there is a narrow passage inside between this shoal and the bank which lines the main shore. **Maragon Hill**, on which is Belvidere house, situated 2 m. to the N.-ward of Bombay castle, is of middling

height, not easily known till well up the harbour. **Parrell Hill**, 2 m. farther N.-ward, is a round mount having on it a flag-staff; but this, and an oblong hill near it covered with trees, are not perceived till far up the harbour. **Suri Fort** (Sewree) is on a point of land overlooking the harbour, to the E.-ward of Perell, and more than 2 m. N.N.E. of Mazagon Hill.

Neat's Tongue or Tromba Highland, deriving its name from its remarkable aspect when viewed from the S.W., has a little mosque called **Pau Pir** on its tip or S. end, by the margin of the water in the harbour. From this tip of the Tongue the hill rises in a gradual slope to the N. for 2 m., and there attains its greatest elevation of 980 ft. above the sea. The mosque on the tip of Neat's Tongue bears N.E., and is 6 m. from Bombay castle.

BOMBAY LIGHT-HOUSE, in lat. $18^{\circ} 53' N.$, lon. $72^{\circ} 48' E.$, has a first-class light, *revolving* every 2 m. on a circular White column, at an elevation of 182 ft. above H. W., mark, on* the S. end of Colaba, where the land is 40 ft. above the sea. The light-house is kept white, and may be seen a dozen miles off in clear weather, when the sun shines on it, but there is generally a haze about the entrance of Bombay harbour. At night the brilliancy of the light can be seen 17 m. from a vessel's deck, and considerably further from aloft. From the light-house the Outer light-vessel bears S.S.W. $4\frac{1}{2}$ m., and the Inner light-vessel bears E.S.E. nearly $1\frac{1}{2}$ m.

Signals. Blue lights are burnt in answer to vessels doing the same, and signal guns are fired from the vicinity of the light-house. The Prongs gun, on an elevated piece of ground to the S.W. of the light-house, is fired to call immediate and quick attention to signals made from the light-house. A life-boat is kept in readiness in the vicinity.

OUTER LIGHT VESSEL is moored in 7 fathoms, L. W., at the distance of $7\frac{1}{2}$ m. N. by W. from Kundari Island, and at $4\frac{1}{2}$ m. to S.S.W. of Colaba old light-house. This outer light is now Red, and *revolving* every 20 seconds, elevated 36 ft.; the vessel's hull is painted Red, she has a Red ball at mast-head, and hoists a Red flag in the daytime, when a square rigged vessel is in sight. At night she burns a blue light every hour, and displays a torch at the half-hour. The flood-stream passes by her to the E.N.E., and the ebb-stream to the S.W., the latter making at about 12 hours on F. and C. of moon, when the average rise and fall is 15 or 16 ft., and at neaps 9 ft.

Bearings. From the Outer light the Colaba light-house bears N.N.E. $4\frac{1}{2}$ m.; the Fairway buoy bears N.E. by N. $\frac{1}{2}$ m.; the Inner light, or Sunken Rock vessel, bears N.E. $\frac{1}{2}$ N. $4\frac{1}{2}$ m.; the shoalest part of Thull shoal E.S.E. 2 m.; and the extreme foul ground of the S.W. Prong bears N., less than 2 m. distant. When the Outer light is seen, bearing on any point from N. to E. round by the E., as far as S.E. by S., a ship can steer directly for it; and, when up with it, should steer from it N.E. easterly, so as to pass about $\frac{1}{2}$ m. to the E.-ward of the Inner light, or Sunken Rock vessel. After rounding the latter she may steer more northerly, and if at night should anchor with the Inner light bearing S.W. by S. distant rather less than a mile, and the Dolphin green light N.W. by N., where the water will be comparatively smooth in the S.W. monsoon.

Inner Light Vessel, or Sunken Rock vessel, placed about 2 cables' lengths to the S.-ward of that rock, bears N.E. $\frac{1}{2}$ N., and is rather more than $4\frac{1}{2}$ m. from the Outer light, and nearly $1\frac{1}{2}$ m. E.S.E. of Bombay light-house. Her light is *fixed*, about 35 ft. high.

Both light-vessels are painted Red, each carrying a Red ball on the light mast, and during daylight they hoist a Red flag when a sail is in sight.

Dolphin Light, *fixed*, is a small light placed on the Dolphin shoal, inshore of the man-of-war anchorage, and 1 m. S. of the Castle flag-staff; it is on a stone tower, 20 ft. above H. W., and shows a Green light to the S. and E., and White on the N. or town side, but is screened to the W.-ward.

The **FAIRWAY BUOY**,† a spire buoy, was formerly placed in the entrance of the harbour to guide ships into the fair channel during the S.W. monsoon, when pilots are prevented from getting out beyond the reefs on the flood tide. This buoy was placed between Thull reef and the Prongs, in $6\frac{1}{2}$ fathoms at L. W. spring tides, and 9½ fathoms at H. W., distant from the nearest part of Thull reef $1\frac{1}{2}$ m., and from the nearest part of the Prongs $1\frac{1}{2}$ m. Kundari island bears from it S. $\frac{1}{2}$ E.; Outer light S.W. by S. $\frac{1}{2}$ m.; the old light-house N. by E. $\frac{1}{2}$ E.; Thull Knob, E.S.E., well open to the N.-ward of the northern Pap; Sunken Rock floating light-vessel N.E. $\frac{1}{2}$ N., on with Butcher's island; Oyster Rock beacon N.N.E. $\frac{1}{2}$ E., a little open to E. of Cross Island.

Fairway. Entering the harbour without a pilot, a ship should round the Outer light, or pass at a small distance to S.-ward of the Fairway buoy: then steer N.E., N.E. by N., and N.N.E.,

* A new Light-house is being built on the rocks, near the Prongs, and another on Kundari Island is now exhibited. These call for great alterations in the Directions, which with the Port Rules and Port Limits of Bombay, will be given at the end of this Chapter.

† The Fairway Buoy is said to be removed, after the erection of Kundari Light-house.

if flood-tide; but, if ebb-tide, steer E.N.E., N.E. by E. and N.E. to avoid the S.E. Prong, and afterwards be careful to pass outside, or to the E.-ward of the Sunken Rock vessel, or buoy, and then wait for a pilot.

THULL SHOAL, a patch of sand, rock, and mud, with a little under 3 fathoms least water, is $2\frac{1}{2}$ m. in extent N. and S., and only half as broad. Practically the Thull shoal may be said to extend more than $3\frac{1}{2}$ m. to W.N.W., from the little hillock on the main land with a tree on it, called Thull Knob; but there is a narrow passage through this dangerous ground, with a depth of 5 fathoms, which may be sometimes taken advantage of; although old leading marks, the large tree on E. end of Butcher's Island and Tromba old church in one, are not very distinct.

This Shoal, the S. end of which is situated 5 m. N. of Kundari, may be considered during the S.W. monsoon the greatest danger, in the entrance of the harbour, to ships at a great draught of water. The least water on it is now 17 ft., and it is generally composed of rocky bottom in patches, with large gaps of soft ground between them. The gap or channel of deep water and soft ground, extending N.N.E. and S.S.W., between Thull shore and the shore reefs, seems to have shoaled since Cogan's survey, nearly 50 years ago. The ship *Surat Castle* struck on one of the outer patches of rocks, lost her rudder, and narrowly escaped from being wrecked, by the high sea lifting her over it into the gap of soft ground inside, where there are two fathoms more water than on the outermost rocky patches.

The outermost part of Thull shoal, on which are only from 3 to $3\frac{1}{2}$ fathoms at L. W. spring tides, lies 3 m. W.N.W. from the nearest shore of Thull; and a direct line S. from the old light-house, just clears but nearly touches the W. edge of the outermost patch of rocky ground. With Thull Knob bearing between E. $\frac{1}{2}$ N. and E. by S. the foul ground is very dangerous, for the rocky patches project farther out with this bearing, and the depth of water decreases very little near them. With such bearing of the Knob, approach no nearer the foul ground than to bring Kundari Island S. $\frac{1}{2}$ E., or Colaba light-house N. $\frac{1}{2}$ E.; or keep the latter a little open to the E. of all Kambala Hill, which is the northern extreme of Malabar Hill, until the large rock, called Gull Island, in the channel leading to the entrance of Penn River, is about half a point or twice its breadth open to the S.-ward of the low woody S. point of Caranja near the Great Hill; or until the S. brow of this hill bear E. by N.; you are then to the N.-ward of the extremity of Thull Reef. With Gull Island very little open, or touching the low woody S. point of Caranja, when the light-house bears N. $\frac{1}{2}$ W., or is a little shut in with the Eastern part of Malabar Hill, you are on the N. point of the foul ground, where $4\frac{1}{2}$ fathoms, rocky bottom, is the least water at low spring tides.

There is no danger in the fair season by borrowing a little upon this point of the foul ground; from 4 to 5 fathoms, hard ground, being the smallest depths at L. W.; but do not shut Gull Island far in upon the low woody S. point of Caranja. Several ships have passed through the gaps or channels inside the rocky patches in the fair season without knowing it, and there is depth at half tide on them sufficient for a ship when the sea is smooth; but, in the S.W. monsoon, the high sea that rolls in towards Thull seems sometimes ready to break on the outermost rocky patches of the foul ground.

THE S.W. PRONG, the extremity of the reef off Colaba light-house, forms the Northern boundary of the entrance into the harbour, Thull Shoal being the Southern, and the breadth of the intervening fair channel is about 2 m. From the extreme point of foul ground of the S.W. Prong the light-house bears N.E. $\frac{1}{2}$ N. nearly $2\frac{1}{2}$ m., nearly half of which distance is dry at lowest water of spring tides. Malabar Point bears from the S.W. Prong N. $\frac{1}{2}$ E. $4\frac{1}{2}$ m. The S.W. Prong consists of sharp rocks; and, being steep, the soundings give no warning near it. At L. W. spring tides the rocks appear above the surface to a considerable distance from the light-house; and, when the sea runs high in the S.W. monsoon, heavy breakers appear far out upon the Prong at L. W., but not to its extreme point.

For rounding this Prong, and entering the harbour, a good mark in clear weather is, Funnel Hill kept just open, or touching the N. brow, of Caranja Great Hill; or that part of the hill E. $\frac{1}{2}$ N. until the Oyster Rock is brought on with the flag-staff of Bombay Castle, or the whole of Butcher's Island seen to the right of the Inner light-vessel, which marks lead clear of the S.E. Prongs till the latter vessel is reached. Steer then well to the E.-ward, to pass clear of the Inner light-vessel by the Sunken Rock shoal, by bringing Mazagon House or hill just open to the E.-ward of the N.E. bastion of Bombay Castle. This mark continued will carry a ship clear to the E.-ward of the Sunken Rock shoal and of the Dolphin Reef, and to the W.-ward of the Middle Ground shoal, among the shipping in the harbour.

When Funnel Hill is not seen, Thull Knob on with the northernmost of the two Paps is a safe but close mark in passing the extreme point of the Prong. Do not bring the Knob of Thull

to the S.-ward of this northern Pap; for, if brought between the Paps, you will pass over the point of the Prong, where a large ship may strike on the rocks at L. W., if there is any swell.

The extremity of the S.W. Prong is steep-to, and the soundings near it are no guide; but to the N.-ward of the Prong, when the Peak of Elephanta is seen to the left of the light-house, the depth decreases gradually from seaward to the edge of the hard ground that projects from the rocky ledges of Back Bay to seaward.

S.E. Prong. When the light-house bears N.N.E., there is a gap in the reef, with soft bottom, and the same depths of water as in the channel. This gap separates the outer part of the reef, or S.W. Prong from the eastern part, generally called the S.E. Prong, which commences when the light-house bears about N. by E. $\frac{1}{2}$ E., extending in a N.E. direction to the Sunken Rock Shoal. This part of the reef is also rocky, with some small gaps of soft ground; and deep water on its outer edge, when the light-house bears from N. $\frac{1}{2}$ W. to N. by E. There are several small holes, or places of soft ground and deep water, well in upon the reef; but there is shoaler water, less than 2 and 3 fathoms, with rocky bottom, much farther out, towards its exterior edge, when the light-house is in line with the signal flag-staff on Kambala Hill. The soundings near the S.E. Prong, like those close to the S.W. Prong, are soft mud, but are no guide in the* approach toward it; the depths being nearly the same in mid-channel as close to the reefs, or not more than half a fathom different: there is rather less depth near the edge of the foul ground off Thull, than towards the reef off Colaba.

Having so far entered the harbour as to have the light-house N. by W., the reef projecting round Colaba is not so steep and dangerous as it is farther out; for the hard rocky bottom is then more even, and a ship not drawing much water might venture to get a hard cast on it, when the light-house is more Westerly than N. $\frac{1}{2}$ W. and the tide flowing fast; but, if near L. W., with any swell, it would be imprudent to borrow on the edge of the reef in any part.

Sunken Rock Shoal is nearly $\frac{1}{2}$ m. in length E. and W., and nearly 2 cables' length in breadth at the widest part, consisting of hard uneven ground, and has 2 and 3 fathoms on it at L. W. springs. On the E. edge there is a large rock, on which the sea sometimes breaks, when near L. W. in the S.W. monsoon, and the sea-weed on the top of the rock is visible sometimes when the tide is very low on the springs. A buoy is in general placed near it on the outside, and a light-vessel moored 2 cables' lengths to the S. of the rock; this vessel bears from the old light-house E.S.E., $1\frac{1}{2}$ m. From this outer rock the shoal has been called the Sunken Rock, though it is properly a considerable shoal, having another rocky place of $1\frac{1}{2}$ and 2 fathoms, at L. W., on the inner part of it, about $\frac{1}{4}$ m. from the former. Between them the depths on the shoal are 2, 3, $3\frac{1}{2}$ fathoms at L. W., generally hard ground; and the inner part of this shoal joins to the upper end of the reef projecting from Colaba, which makes the passage inside the Sunken Rock Shoal unsafe, except for small vessels.

Malabar Point Flag-staff on with Oyster Rock Beacon, leads well clear to the N., or above the sunken Rock Shoal. Malabar Point open to the S. of the S. grove of brab palm trees on Colaba, leads clear to the S. of the Sunken Rock Shoal. Mazagon Hill all open with the outer bastion of the castle, leads clear to the E. of this shoal.

Dolphin Reef, on which a little light-house is now erected, is a rocky shoal projecting from Broughton Grove, a large plantation of brab trees on Chota Colaba; on the inner part of this reef near the shore, the rocks at L. W. springs are dry. The **Dolphin** has a *fixed Green light*, elevated 20 ft. above H. W., and visible 2 or 3 m. in clear weather within the harbour. There is a depth of 4 fathoms, at L. W., half a cable's length E. of this light. **Apollo, or Polwa Spit**, projecting from the dockyard to a considerable distance, is hard and stony; ships moor clear of it, to prevent grounding, or rubbing their cables. When on the outer point of this spit, where there is a depth of only 9 ft. at L. W. springs, the Colaba Light-house is in line with the tip of Jamsetji's Bunder, and the cathedral is just over the N. end of the dockyard breakwater.

Middle Ground Shoal is steep all round; on the S.E. side it is a steep wall of rocks, the sea breaking on it at L. W. spring tides, when blowing hard; there being only 3 or 4 ft. on the shoalest place at these times. At its N. end there is a black buoy, and at its S. end there is a black and white buoy. The Middle Ground Shoal has now a battery built upon it, and this renders it no longer so great a danger as formerly; but it causes the tides in its vicinity to run with much greater velocity now in that part of the harbour, which is an inconvenience to shipping.

Suri Fort just touching the W. point of Cross Island, leads clear inside or to the W. of the Middle Ground. The oblong woody hill (close to the N. of Parell Hill), a little more than half shut in with the W. end of Cross Island, leads clear to the E., or outside the Middle Ground; or another

* The new Colaba Light is to show a Red danger signal when ships are too near the Prongs.

mark to pass outside of it is, Cross Island open twice its breadth to left of Suri Fort. When clear to the N. of this shoal, the Scotch kirk steeple is on with Malabar Point flag-staff. And Malabar Point flag-staff on with Cooperage tree, leads clear of it to the S.; another mark for being to the S. of this shoal is, Marine Office flag-staff on with Scotch kirk.

Flag-staff Shoal, which has a Red buoy on it, consists of rocky bottom, the depths on its shoalest parts being about 12 ft. at L. W. spring tides. Between this and the two last-mentioned shoals is the space where the ships generally moor (**the harbour**), abreast the town, in 4 or 5 fathoms, L. W., soft mud. The old church or cathedral steeple and castle flag-staff in one, and the left side of the Oyster Rock Battery touching the right side of the Dolphin Beacon is on the centre of Flag-staff Shoal; but when all the Oyster Rock is seen to the left of the Dolphin Beacon, you are clear of it on the outside. When clear to the N. of it, the cathedral steeple is a little open to the S. of the single brab tree on the castle; and when to the S. of it, the flag-staff on the castle is a little more than half way from the steeple toward the single brab tree.

Caranja Shoal is an extensive bank, on the E. side of the harbour, projecting 2 or 3 m. from Caranja Island to the W. The S.W. edge of it bears from Thull Knob about N.N.W., and from the S. brow of Caranja Great Hill about W., and is nearly 2 m. to the N.W. of Gull Island. The W. point of the shoal lies midway between Gull Island and the Sunken Rock, and bears S.E. by E. from the light-house, distant 3 m. The N. part of this shoal, opposite to the Little Caranja Hill, is steep and rocky in some places; one patch, with only 6 ft. water, lies near its edge, exactly half way between that hill and the dockyard. The S.E. point of Tromba high land open with the N.W. end of Butcher Island; or Tromba old church to the left of the tower on Butcher Island leads clear to the W. of the edge of this shoal. N. of the Caranja Shoal, there is a patch on which is a rock dry at L. W. bearing S. $1\frac{1}{2}$ m. from Butcher's Island. Between this shoal, which is marked by a black buoy, and the rocks off that island, which are marked by a white buoy, there is a deep channel with 5 to 8 fathoms.

On the S. edge of the shoal, which is more even and not so steep, abreast the Great Hill, a ship may (in fine weather) borrow, to have a hard or shoal cast in working, when certain of not missing stays; but should tack on getting the first cast of hard soundings, particularly in a large ship, and near L. W., for patches of 10, 11, and 12 ft. lie not far within the edge of the shoal.

On the S. of Caranja Shoal is a gap of deep water, between it and Thull Shoal, into which gap a vessel may work, if beating into the harbour with a N.E. wind. Thull Knob in one with the Paps, clears to N. of Thull Shoal, and a ship may stand to E. till Gull Island touches the low S.E. point of Great Caranja; taking care not to let the W. hills of Hog Island disappear behind Little Caranja Hill, or Malabar Point flag-staff come on with, or be seen to the right of, the inner Light-vessel. To those acquainted with the distant hills to N.E. of Panwel, the best mark, to prevent a vessel working too far into the gap between Thull and Caranja Shoals, is, not to bring Chanderi Peak (a little sharp peak close to the left of a flat-topped one), quite to touch the N. brow of Great Caranja, taking care, not to let the Inner Light-vessel come on with Malabar point flag-staff.

Tides. By the Outer floating light it is H. W. on F. and C., at 12 h.; but at the Dockhead, and where ships moor, at 11 h. 15 m.; extraordinary springs rise 18 ft., ordinary 15 to 16 ft.: neaps 9 or 10 ft.

In Dec. and Jan., when the sun is near the S. tropic, there is on the springs nearly 2 ft. more rise of tide in the night than in the day; but in June and July, when the sun has great N. declination, the day tides are highest. In the foul weather season, ships are, therefore, moved in and out of dock with daylight; but ships drawing much water must, in the N.E. monsoon, be transported in and out of dock on the night tides. This phenomenon of the inequality of night and day tides in the different seasons is also experienced on the Katiawar, Sind, and Gwadel coasts, at Calcutta, and apparently on the S. coast of China, and in many places of the Eastern seas.

Anchorage. It is requisite for persons sailing in or out of Bombay Harbour, to remember that the tides rise and fall from 14 to 18 ft. on the springs, and 9 or 10 ft. at the quadratures. Except upon the reefs or shoals, the bottom is proper for anchorage throughout the harbour, being soft mud or clay. The velocity of strong spring tides between Thull Shoal and the Prongs is $2\frac{1}{4}$ or 3 m. per hour; abreast the shipping outside the Middle Ground Battery, the tides are now stronger, but not so strong where they moor, nearer to the town. In the entrance of the harbour the tide does not set fair through the channel, but the flood-stream slants over the extremity of the foul ground of Thull to the E., towards the opening leading past Gull Island to Penn River. And, during the rains in the S.W. monsoon, the ebb sets strong out of that river to the W., which greatly assists ships in working out of the harbour; but it is only on the springs that the outlets from the river are strong. The man-of-war anchorage lies between the castle flag-staff and the Inner Light-vessel, and is all marked out by buoys.

DIRECTIONS for running into the Harbour. To refer to all the marks for avoiding the shoals, previously given in describing them, may often be difficult when ships are running speedily into the harbour with a strong wind and flood-tide: the following directions may readily be comprehended to guide the navigator, as the pilots cannot always reach a ship in the S.W. monsoon until she has well entered the harbour.

If a ship in working out meet with severe weather, split her sails, or sustain any accident in the night, so as to force her to return; or if approaching the harbour from sea, with a fair wind for running into it, during the S.W. monsoon; it will be prudent, if Kundari Light is seen, and not the other lights, to keep it well to the S.E. until one of the latter is visible. If the wind is Southerly, do not bring Kundari to the S. of S. by E.; if Westerly, or baffling, with a swell rolling in towards Thull, do not bring Kundari to the S. of at most S.S.E. until the Outer Light is seen; or, on shoaling, haul to the N.N.W., as Kundari Flat extends far out to sea-ward, and joins also to the S.W. part of the foul ground off Thull. In standing towards this flat the depth decreases gradually, and increases in standing from it about N.N.W. toward the S.W. Prong.

The **Revolving Light** is brilliant and seen far off, sometimes 17 m. from a ship's deck; but, during rain, a vessel may sight the Outer Light first, (and when close upon it) and then from it should steer N.E. towards the Inner Light; after reaching which, if no pilot has come off, the ship should be anchored in 5 or 5½ fathoms, at L. W., about a mile to the N.E. by N. of the Inner Light. Due allowance must be made for the effect of a flood-tide and heavy swell. When the Kenery light is seen let it be the principal guide.

When Light-Vessels are not in their place. If the Outer Light were to break adrift, its lamp would of course be extinguished, in which case the following directions may be attended to:—

Should the wind be far to the W., or baffling, with a heavy swell rolling in upon Thull; run into the entrance of the harbour, keeping the revolving light N.N.E. to N.N.E. ¼ E., until the S.W. Prong is judged to be near; then edge away to the E. The light-house N.N.E. ¼ E. leads a ship within the extreme point of the S.W. Prong; when bearing N.N.E. it is on the large gap of the reef between the Prongs. If the wind prevail brisk at S.W., bring the revolving light N. N. E., or N. by E. ¼ E., and run in with these bearings, which will carry a ship fairly to the entrance of the harbour, about mid-channel between the extremity of the S.W. Prong and the edge of Thull Reef, until Kenery Light bears S.S.E. Then you may keep the Revolving Light about one point on your *port* bow, and, when Kenery Light bears S. by E. and the Revolving Light N. by E. ¼ E., you may keep away to N.E., afterwards hauling up gradually as Colaba Light passes to the W. of a N. bearing. When thus far advanced the Inner Light will surely be seen, and may be steered for as above.

The Inner Light is not so likely to be out of place, but the following directions are given in case of such an event. When advanced to the mid-channel between the Prongs and Thull Shoal, if the night is not very dark, Caranja Great Hill will be seen, known by its bold and even shape, and by the bearing. When its S. brow bears E. by N. ¼ N., it is in one with the N. extremity of the foul ground off Thull, where the smallest depth is 5 fathoms at L. W. with this bearing. When the S. brow of this hill bears E. by N., you are to the N. of all Thull foul ground, and ought to edge over to the E. to give a berth to the S.E. Prong and the Sunken Rock Shoals. The Sunken Rock bears N. ¼ E. from Kenery Light, and is due S. of the Dolphin Green Light.

When running in with the revolving light N. by E. to N.N.E., if the night is dark, and the Outer Light-vessel not in its place, and Caranja Great Hill not discernible, it may be difficult to know when you are to the N. of Thull foul ground, and approaching the S. edges of the Prongs; unless you see Kenery Light, which is now a good mark for entering. The N. part of Thull foul ground, where there is any danger, is distant from the light-house upwards of 4 m.: whereas the Prongs are only 2 and 2½ m. from it, when it bears N. by E., or N. by E. ¼ E.; either light may therefore be useful as a guide, by attending to its brilliancy and appearance, to judge from what side of the channel it is seen. The S. brow of Caranja Great Hill is in one with the outer edge of the Prongs when bearing E. ¼ S., and as it bears E. by N. ¼ N. from the N. extreme of Thull foul ground, this narrow part of the channel is comprehended between these bearings.

Running in under easy sail, with the revolving light bearing N. by E. to N.N.E., if Caranja Great Hill is not discernible, and you judge yourself to be to the N. of Thull Shoal, and approaching the S. part of the Prongs, by the appearance of the light or otherwise, edge immediately well over to the E., until it is brought to bear N. by W., or N.N.W.; you will then be above the Prongs and most dangerous parts of the reef. Should you be deceived in estimating the distance from the light, and have a hard cast on the edge of the reef, with the light N. by E. or N. by E. ¼ E., haul out instantly to the S.E.; it being steep-to, with deep gaps from 6½ fathoms, soft, to 8½ or 4 fathoms, rocky ground, at L. W., with these bearings. On the other hand, should you

have edged to the E. before being clear to the N. of Thull Shoal, and get hard or irregular soundings on it, haul to the N.W. a little, till in the fair channel.

The line of 5 fathoms soundings, at L. W., runs pretty straight to S.W. from the Thull Shoal till 5 m. to N.W. of Kundari, where the shoal mud-flat is most projecting, and from whence the light-house bears about N.N.E. $\frac{1}{2}$ E. If running in with the light-house N.N.E., the vessel will cross the flat and then increase her water by 2 fathoms gradually towards the Prongs, within $\frac{1}{2}$ m. of which the deepest water is. On the above course the lead will be a guide.

Having passed inside of Thull Reef and the Prongs, as directed, and the revolving light bearing N. by W., you are then fairly entered into the harbour, and may steer N.E. to N.E. by N. on flood-tide, or N.E. on the ebb, until the revolving light bears W.N.W., when a vessel may haul directly to the N., and anchor, with the revolving light any way between W. and W.S.W., and the body of the shipping at anchor bearing N., which are fair bearings, betwixt the Sunken Rock and Middle Ground Shoals; about $\frac{1}{2}$ m. to N.E. of the former. If the night is dark, to prevent running too close to the Oyster Rock, or too near the Middle Ground Shoal, anchor with the revolving light bearing from W. to W. by S.

If a ship, in edging to the E. to give a wide berth to the Sunken Rock Shoal, get so far over as to have a shoal or hard cast on the edge of Caranja Shoal, there is no danger if she haul directly off to regain the fair channel in the W. side of the harbour, for this shoal is not here so steep as it is farther up abreast of Caranja Little Hill, opposite to the town of Bombay. With the wind at W. or W. by N., it will not be prudent to make free with the E. side of the harbour, either towards Thull Reef, or Caranja Shoal. Therefore do not bring the Kenery Light to the S. of S. by E., until you are to the N. of Thull Shoal; and, when abreast of Caranja Shoal, do not bring Kenery Light to the W. of S. by W.

DIRECTIONS for working into the HARBOUR, during the night in clear weather. When the sky is clear in the night, during the fair-weather season, when the wind hangs between N. and E., persons a little acquainted with it may, to save time, work into the harbour with the land-wind and flood-tide, after Kundari and other lights are discerned. Work towards the entrance of the harbour, traversing with the revolving light when seen from N. by E. to N.E., until you are to N. of the Outer Light-Vessel, or the S. brow of Caranja Great Hill bear E. by N.: being then above the extremity of Thull Reef, long tacks to the E. may be made with safety, towards the S. end of Caranja Shoal. Gull Island may be approached as near as $1\frac{1}{2}$ m., when bearing between E.N.E. and E.S.E., which will be a depth of about 5 fathoms, at half-flood. But, when in this gap between Thull and Caranja Shoals you must not bring Kenery Light to the W. of S.S.W.

When the S. brow of Caranja Great Hill bears to the N. of E., you are to the S. of the S.W. rocky patches of Caranja Shoal; and, in standing to E. towards that Hill, be careful not to let the Inner Light and Revolving Light approach each other within one point. When the S. brow bears E., you are on the parallel leading close to the outer edges of the Prongs, and, in tacking from the N. side of the channel, ought to keep the Inner Light-Vessel to the N. of N.E. $\frac{1}{2}$ N. With the Revolving Light bearing from N.N.W. to N.W. the edge of the reef is not so dangerous, nor so steep, as farther out near the Prongs; and a ship, with these bearings, if not going fast through the water, nor drawing above 18 or 19 ft., might venture to get a hard cast on it, when the tide is more than half-flood. Otherwise this is not advisable, for some ships, even in day-light, by borrowing too close, have struck on this part of the reef near L. W.

In standing from the Prongs towards the middle of Caranja Shoal, the soundings will be a good guide as they decrease gradually. When Great Caranja S. brow bears to S. of E., tack on shoaling to 5 fathoms at L. W., or 7 fathoms towards H. W. But with Little Caranja Peak bearing E. or to S. of E., the soundings will not be such a guide, so a vessel must take care not to go near the N.W. extreme of Caranja Shoals, where there is a sunken rock under 6 ft. of water, only 3 cables from depths of 6 and 7 fathoms at L. W. And it must be remarked that, hereabouts, the E. side of the harbour is deepest, and that it shoals gradually towards the Middle Ground; whereas, S. of the Inner Light, the W. side of the harbour by the Prongs is the deepest, and thence it shoals over towards Caranja.

The Harbour. Generally, ships are moored inside the Middle Ground Battery; but not always; some ships, when the harbour is crowded, moor to the N., in the stream of that shoal. As before remarked, the raising of that shoal above H. W. level, to form the battery, causes the tides to rush stronger in some places, known to the pilots. It would be imprudent for a stranger to pass within the Middle Ground Shoal to the shipping, when no marks are discerned in the night, to lead him round the outside and N. end of it; he ought, therefore, to anchor before the Revolving Light is brought to bear W.S.W.; or, if needful, this may be done farther out, between the Sunken Rock Shoal and the entrance of the harbour, where the sea is broken by the reef projecting from Light-

house Point; but farther up, above the Sunken Rock Shoal, it is more smooth. The Port Rules forbid any vessel, if above 200 tons, to run up amongst the shipping until she have received permission from the master-attendant or his deputies.

When the wind is Northerly, ships generally work up between Caranja Shoal and the Middle Ground Shoal, then pass round the N. end of the latter in proceeding to their moorings; this is the most convenient method with a N. wind and flood-tide. The channel outside the Middle Ground Shoal, between it and the N. part of Caranja Shoal, is about $1\frac{1}{2}$ m. broad.

DIRECTIONS for working out of the HARBOUR. During the S.W. monsoon, the spring tides are favourable for working out of Bombay Harbour; as the freshets, produced by the rains, then set strong out of Penn River, directly between Thull Reef and the South-west Prong, to the W., greatly assisting a ship in working out; whereas the ebb-tide is weak on the neaps, with baffling light winds intervening between the squalls, and a heavy sea rolling in, which frequently prevent ships from getting an offing. Some ships have worked out on the neap tides to 18 fathoms, and were driven with a heavy swell, during light baffling winds, back again into the Harbour.

A large ship, proceeding to sea, should have her main top-gallant mast up, with the sail ready for setting, for it will be found very useful in assisting her to obtain an offing, when intervals of light breezes are frequent between the squalls; and all ships sailing from this Harbour, from the middle of May to Sept., ought to have strong sails bent.

In working out of the Harbour in June and July, or in blowing, unsettled weather, be sure to keep the entrance open, when the pilots leave you, by working with the Revolving Light, or Light-house, whilst visible, bearing from N. $\frac{1}{2}$ E. to N.N.E. $\frac{1}{2}$ E.; the entrance of the Harbour will then be retained open, into which the flood-tide and swell will drive you, if there is little wind, and prevent you from being drifted to the N. of it, or from being necessitated to anchor outside. This can never be done in the S.W. monsoon, without the risk of losing the anchor, and probably greater loss may be sustained. When outside of Thull Reef, the water will deepen in standing to the N.W., near the S.W. Prong, and will shoal in standing to the S., if you approach the Flat off Kundari Island. The Light on that island should not be approached within 3 m.

In June and great part of July, as the squalls come mostly from W.S.W., a ship should work to the S. of the entrance of the Harbour with the ebb; the following flood will not be there so strongly felt as near the reef, and a considerable stretch may be made to sea-ward, if the wind will admit, taking care not to get to the N. of the S.W. Prong, by keeping Colaba light-house to the N. of N.E. by N. Bound to the S., after getting into 20 or 22 fathoms water, you may continue to stand along the coast, if the depth does not decrease, observing to make a stretch to the N.W., at times, when the wind is favourable, until you get into 35 or 40 fathoms; you may then safely proceed to the S., occasionally sounding, to be certain that the depth does not decrease.

In Aug. it is seldom difficult to get an offing, for the squalls draw to the N. of W., and the freshes usually set strong out of the rivers, enabling ships at times to stand from the Harbour direct to the S. without tacking; this has also happened in June and July, although seldom. In Aug. it is not so dangerous to get to the N. of the S.W. Prong, although still advisable to keep the entrance of the Harbour open. In this month, when bound to the S., you need not be particular to obtain a great offing in the parallel of Kundari Island; but after rounding that island, you may stand along the coast, if the wind permit you to increase the depth of water; otherwise a tack at times must be made until it is increased to 30 or 35 fathoms.

BOMBAY PORT RULES.

CLAUSE I.—Firstly. No vessel, if above 200 tons, entering Bombay Harbour, shall run up amongst the shipping until she shall have received permission from the Master Attendant or other duly authorised person, but must anchor within and to the E. of the Inner Floating Light; and no such vessel, anchored within the limits of the Port of Bombay, shall move from one place to another within the Port between sunset and sunrise, without special permission of the Master Attendant. **Secondly.** A vessel working out of Harbour, if not clear of it at sunset, will anchor. In the S.W. monsoon, both anchors and cables are to be kept clear should they be required, and the sheet-cable to be bent to the anchor. **Thirdly.** All vessels above 200 tons, entering or leaving the Harbour whilst a pilot may be on board, are to ply their national flag from the time of his boarding to the time of his leaving, from the time of sunrise to sunset, or before and after, as long as the flags may be visible: and also every ship will show her number on entering the Port.

CLAUSE 2.—All vessels above 200 tons, within the Port of Bombay, shall be bound to take up such berth as may be appointed for them by the Master Attendant, the Harbour Master, or their Assistants, and shall change their berths or remove when required by such authority. The berths of

...asting craft and small vessels to be determined under the provisions of Section 59 of Act I. of 1852 by the Customs Authorities, with the consent and approval of the Master Attendant.

CLAUSE 3.—All vessels in the Port of Bombay shall have their flying jib-booms rigged in, and shall, when ordered by the Master Attendant, rig in their jib and driver booms, and strike their masts or yards; and any signals made from the dock-yard shear flag-staff directing the striking of masts or yards, or the rigging-in of booms, shall be considered to be orders, and obeyed as such.

CLAUSE 4.—Cargo boats, full or empty, shall not be allowed to swing astern of any vessel without permission; nor shall anchors be cockbilled, or spare spars allowed to hang alongside or astern of any vessel. [Two tier of two boats, two boats in each tier, may be allowed to hang astern of each ship; all in excess of this the registered numbers will be taken, and the full penalty the law allows will be enforced against the owners of said boats, in accordance with Act XXII. of 1855.]

CLAUSE 5.—Vessels taking in or discharging ballast, or any particular kind of cargo within the Port of Bombay, to take up such berth as Master Attendant or Harbour Master may direct.

CLAUSE 6.—Free passages to be kept to all piers, jetties, landing-places, wharves, docks and moorings; and all boats and vessels shall be bound to move, when required, to clear such passages. [Boats, whether ship's boats or boats plying for hire, are not permitted to lay alongside any of the piers or landing-places longer than is actually necessary to embark or land passengers and their baggage, &c., but will anchor or lay off at a distance of at least 30 yards from such pier or landing-place, so as not to obstruct the approach thereto. For any infringement of this notice, the offender is subject to a penalty of 100 Rupees, or punishable on conviction before a magistrate.]

CLAUSE 7.—All vessels within the Port of Bombay will moor and unmoor according to the orders of the Master Attendant or the Harbour Master, and shall keep a clear hawse.

CLAUSE 8.—On making a written application to the Master Attendant, a vessel may be moved from any mooring or anchorage within the harbour to any other mooring or anchorage approved by the Master Attendant, on paying the rates specified in Act XXXI. of 1857. All vessels within the Port of Bombay shall be moored or warped from place to place, as required by the Master Attendant or Harbour Master; and no vessel shall cast off a warp that has been made fast to her, to assist a vessel mooring without being required so to do by the pilot or officer in charge of the vessel mooring.

CLAUSE 9.—No vessel shall use any of the Government chain moorings, whether fixed or swinging, without permission of the Master Attendant or the Harbour Master.

CLAUSE 10.—All vessels occupying Government moorings, fixed or swinging, shall be liable to pay for the same according to the following scale, but no more:—

For Fixed Moorings.	From 1st Nov. to 30th May.	From 1st June to 31st Oct.
All vessels up to 199 tons ..	Rupees 1 per diem.	Rupees 3 per diem.
Ditto from 200 to 299 "	2 "	4 "
Ditto " 300 to 399 "	3 "	5 "
Ditto " 400 to 499 "	4 "	6 "
Ditto " 500 to 599 "	5 "	7 "
Ditto " 600 to 999 "	6 "	8 "
Ditto " 1,000 & upwards	8 "	10 "
Swinging moorings	3 "	4 "

CLAUSE 11.—No boats to ply as cargo boats except under license, as provided for by Section 68 of Act I. of 1852.

CLAUSE 12.—*Firstly.* No boats lying within 50 yards of the dock-yard stairs or wharves, or within 50 yards of the wharf in the basin formed within the break-water in the vicinity of the Custom House Bunder, or Government docks, will be allowed to have fire on board. *Secondly.* No vessel shall boil pitch on board, but must do so in a boat alongside or astern. *Thirdly.* All vessels taking in cotton whilst the hatches are opened, and during the stowage of the cotton, are not on any account to have any lights in the hold or orlop, and the fires to be put out, and all spirits, oil, paints, and spirits of turpentine, are to be placed in a place of security. *Fourthly.* All vessels that may require to be steamed, must be moored below the middle ground, clear of the shipping.

CLAUSE 13.—No private vessels are to hoist signal lights at night, or to fire any great guns, or muskets, at the hours of sunrise or sunset, or at any other time, without permission, excepting in cases when requiring assistance.

CHAPTER XIV.

WEST COAST.—BOMBAY TO CEYLON.

BOMBAY—KENERY—CHOUL—RAJHURI—BANKOT—SEVERNDRUG—ANJENWIL—JAIGHUR—RATNAGHIRI—VIZIADRUG—DEWGHUR—MALWAN—VINGORLA—RAREE—GOA—CAPE RAMAS—CARWAR—TUDRI—CUMTA—HONORE—PIGEON ISLAND—CUNDAPUR—MANGALORE—MOUNT DELLY—CANNANORE—TELLICHERRY—MAHE—CALICUT—COCHIN—ALIPÉE—QUILON—TREVANDRUM—CAPE COMORIN—GULF OF MANAR—TUTICORIN—PAUMBEN PASS—CEYLON—COLOMBO—POINT DE GALLE.

(VARIATION OFF BOMBAY, 0°; AT POINT DE GALLE, 0° 30' E.)

Although the W. side of the Peninsula of Hindostan is generally called the Malabar Coast, this appellation belongs properly to the S. part; for the whole extent comprehends three provinces, the N.-most of which is **Concan**, or **Konkan**, extending from below Damaun to Cape Ramas. The N. Concan, which includes Bombay Harbour, has been already described, with the high land of Thull on the S. side of it, and **Kenery Island**, which stands 11 m. due S. of old Bombay light-house, and 2½ m. off the main land. **Unari Island**, or **Ondaree**, generally called **Henery**, is 1½ m. to E. ½ N. of Kenery, and Thull-kari is to the S.E. of it. Between Kenery and the main there are several rocky patches, and others lie scattered about off the coast as far as Choul. **Alibagh Town** lies to the N.E. of Kolaba Island, which was formerly called **Angria's Kolaba**.

Kolaba, or **Coulaba Island**, in lat. 18° 37½' N., lon. 72° 50' E., bearing S.S.E. from Kundari Island, distant 5 m., is situated near the shore, at the entrance of a river, having 3 fathoms water within it: these two islands and **Ondaree** formerly belonged to the **Mahratta** pirates, and are well fortified. About 3 m. S.S.W. from Coulaba Island there is a rocky bank, part of it dry at half-tide, having 5 fathoms at L. W. outside, and 3 or 4 fathoms within it; a ship ought not, therefore, to approach the shore here in the night nearer than 6 fathoms at L. W.

CHOUL, or **CHAWAL HARBOUR**, in lat. 18° 32½' N., lon. 72° 54' E., is 5 m. farther to the S.E., having 3 fathoms water at the entrance, which is protected by a fort on each side, and inside there are 6 and 7 fathoms. This Harbour was also formerly possessed by the **Mahrattas**. Off Choul, the fishing stakes lie out in 6, 7, or 8 fathoms water, in the fair season. **Choul Town** is on the N. side of its river, which is called **Kundali-ka-kari**, and what navigators call **Choul Knob** is **Kurla Knob**, the highest peak of the range situated to the S.E. of **Kurla Fort**, commonly called **Choul Fort**, a hill (like an island when distant) of reddish earth, with dark wooded hills behind it. This Fort is on the S. side of the river, and the entrance is between it and a spit of sand lying off **Rewadunda Fort** (on the N. side). The river entrance is only accessible to coasters, but a small steamer could enter at H. W.

On the N. of Choul is the high land of **Kolaba**, appearing in undulating hummocks; that part called the **Hummocks of Thull**, bears from **Kurla Fort** due N. nearly 10 m. On its N.W. extreme, more prominent than the rest, stands **Kankeshwur**, a tabular hill, the single tree peak of which, called **Ramdhurna** (One-tree Hill on the charts), is the leading feature of the southern hummocks of Thull, elevated 1,060 ft. above the sea, and situated 2½ m. from the beach, and 5 m. E. of **Kundari Island**. **Keyim Bungalow** is on the beach, nearly 3½ m. N.W. from One-tree Hill.

Choul Kadu Bank is a rocky patch, with 2 fathoms at L. W., bearing from **Kundari S.** by E. 7½ m., and from **Kurla Fort N.W.** ½ W. 5 m. This is the outermost of several patches lying off **Kolaba** and **Choul**.

The Coast between Choul and Bankut is hilly and well wooded, and of considerable elevation. **Rajhpuri Headland** is prominent, and its peak is a good land-mark, but liable to be mistaken for **Choul Peak**, which is some 15 m. further N. A ship may, between Bankut and Choul, stand into 6 fathoms at L. W., but as the rise and fall at springs is 2 fathoms, it is a safe rule never to shoal under 8 fathoms, unless well informed of the time of tide. Five miles S.S.W. of Choul there has been found a patch of 3 fathoms only, with 6 fathoms close to sea-ward of it; this patch is nearly 2 m. off shore.

Dumkhum Bay, intermediate between Jyghur Point and fort, (which are nearly 2 m. apart), is a deep little cove, quite open to N. winds, but giving shelter from S. and S.W. winds, in $4\frac{1}{2}$ fathoms, mud, at low water, 3 cables' lengths off shore, by bringing the outer point to bear W. by N., and the single large tree in the bottom of Dumkhum Bay bearing S. This is a snug little anchorage in the S.W. monsoon, where large vessels may venture.

Zyghur or Shastri River. Jyghur Fort, on the E. extreme of the headland and bearing E. by S. $1\frac{1}{2}$ m. from the outer point, looks down upon the entrance of this fine river which, from its sources in the Ghauts, receives (at the distance of 18 m. E.S.E. from its mouth), the waters of three tributaries, the Bao, the Gurni, and another; its lowest reach curves round by the S. to the W., then trends to the N.-ward along the E. face of Zyghur headland, and, discharging its waters at two places, forms a sand-bank between.

The Bar. The principal channel, having 3 fathoms at L. W., is under the fort, close along the cliffs, which must be hugged to avoid the above sand-bank. Within the fort point the water is deep on the S. side of the river, forming a safe harbour for shipping against all winds. The N. entrance (which has nearly as great a depth as that by the rocks, but with more breakers,) is $\frac{1}{2}$ m. N. of the fort; and still further to the N. there is a reef of rocks projecting $\frac{1}{2}$ m. from the N. cliffs, which are separated from Zyghur Fort by the space of $1\frac{1}{2}$ m. The little village of Bunder, in a bight to the E. of these rocks, is at the bottom of Zyghur Bay, which, between Karhteshwur and Bunder, is more than 3 m. deep.

The Coast from Zyghur Point to the S. consists of rocky headlands and sandy bays; it runs about S.S.E. for 7 m. to **Warowri**, a little bluff point, which (projecting to W.N.W. about a mile from the regular line of coast) bears N. by W. $10\frac{1}{2}$ m. from Meria Donghur. The coast is safe to approach into 5 fathoms. On the N. side of Warowri Point there is a little bay and river, similar to that of Kalbadevi, but of smaller extent, giving shelter to coasters from Southerly winds, in 3 fathoms, sand and mud; at H. W., when they get 6 or 7 ft. on the bar, they slip into the river of Warowri. **Amwah Bay**, formed under the S. side of Michi-donghur, (a prominent piece of tableland, about 120 ft. above the sea, and connected with Jyghur headland by a sandy plain,) is $4\frac{1}{2}$ m. N.N.W. of Warowri, and gives shelter from N.-Westers in 4 or 5 fathoms, sand and mud, with the point bearing W. by N. or W.N.W. In the bight, between Warowri and Amwah, are five sandy bays and four rocky points, safe to approach into 5 fathoms.

MERIA DONGHUR is a headland of high round form, lighter in colour than the other land, and appearing like an island when seen from N.-ward or S.-ward. Its highest part is 475 ft. above the sea. The S.W. point bears N.N.W. 2 m. from the light-house on the S. bastion of Ratnaghiri Fort. A deep bay is thus formed between that fort and Meria Donghur, the entrance to which is $1\frac{1}{2}$ m. wide; but a sunken rock, on which the sea breaks at L. W., lies in the centre, with 5 fathoms round it, and 7 fathoms at the distance of 3 or 4 cables' lengths to sea-ward. This dangerous rock in the centre of the bay between Meria Donghur and Ratnaghiri Fort, appears not to have been known to early navigators, who said "the landing-place is on the N. side of the fort, where there seems to be shelter for small vessels during the S.W. monsoon." The bay on the S. side of Meria Donghur affords shelter from N.-Westers, in 3 or 4 fathoms, mud and sand; but the above sunken rock must be avoided, and other rocky patches lying close to the cliffs.

Kalbadevi Bay. The sea face of Meria Donghur headland is nearly 2 m. long, and on its N. side a deep bay affords sheltered anchorage from S. and S.W. winds, in 5 fathoms, mud. During the Indian mutiny (1857), advantage was taken of the shelter afforded in this bay to land troops during the S.W. monsoon, near the mouth of Kalbadevi river, the entrance of which is close to the rocky cliffs, on the N.E. of Meria headland. It has been already mentioned that, when the S.W. monsoon is in full force, there is at L. W. in the daytime, half a fathom more water than the chart shows, in all the bays along this part of the coast. The Ratnaghiri Light will be very useful to vessels wishing to run into Kalbadevi Bay.

RUTNAGHERRY or RATNAGHIRI PORT, S.W. bastion, in lat. $16^{\circ}59\frac{1}{2}'$ N., lon. $73^{\circ}16'$ E., bearing N. $\frac{1}{2}$ W. 6 m. from Paos Point, is on the highest end of the fort, 300 ft. above the sea. This fort covers a large headland connected by a narrow sandy neck with the main, and when viewed from a distance appears insulated, flat, and level like a wall, but the S. end rises higher and attains the elevation above-mentioned. The N. part of the fort (separated from the rest by a valley) has a perfectly flat top 200 ft. above the sea, and covered with trees, within stone walls; on the E. side of this a cove is formed between two points, most useful to the coasting trade during the fine season, when overtaken by a Southerly gale, like that of Jan. 1871, when the small steamer *General Outram* was lost off this port. The water is too shallow to admit of small vessels finding shelter during the S.W. monsoon, as formerly supposed practicable.

On the S. side of Ratnaghiri Fort a large bay is formed, from whence a river (capable of

receiving small vessels over its bar at H. W.) extends some distance inland, having on the N. side of the entrance, on the brow of a hill elevated about 150 ft. above the sea, the Adaulut, or judge's court-house, a large building, with other houses to the E. and N. Boats should not attempt to run into the river except towards H. W. The landing-place in Ratnaghiri Bay, during N.W. winds, is on the E. side of the S. fort near to a small tower, the base of which is washed by the sea at H. W., but a good look-out must be kept for rocks. In the S.W. sea-breezes, which sometimes may come in the fine season, lasting about three days, there is such a swell rolling up to this landing-place that it is recommended not to attempt landing there on such occasions, but to send the boat round to the little bay to the N. and E. of the N. fort. At H. W., if the bar does not break, a large boat may with more convenience run into the river, but should get a native pilot.

Light. Ratnaghiri now shows a Red *fixed* light, at 300 ft. above the sea, on the S.W. bastion of the hill fort. It is *said* to be visible 18 m. in clear weather.

Anchorage. Vessels may anchor in 7 or 8 fathoms, mud, about 1 m. off, with the light N.N.E. to N.E. by E. in the fine season; but in the S.W. monsoon, steamers *only* may come near the place, and run into Meria Donghur Bay. At the S. extremity of Ratnaghiri Bay there are some rocks above water, about $\frac{1}{2}$ m. from shore, with a shoal bank of 2 to 3 fathoms rocky ground extending to the W., the outer edge of which bears due S. from the S.W. bastion of the fort, and its N. edge bears S.W. from the Adaulut. A vessel coming up from the S. should give this foul ground a wide berth, a depth of 7 fathoms being close to it. **By night**, approaching from the S., the smallest steamer should not run up for the light until it bears to the E. of N. by E.

Tides. It is H. W. on F. and C., at Ratnaghiri at 10h. 30m.; ordinary springs rise 8 ft.; high springs 9 ft.; neaps 5 ft.

Poranghur Fort, in lat. $16^{\circ} 48' N.$, (formerly erroneously styled Radjapour) is 12m. to S. by E. of Ratnaghiri, and situated on the S. brow of a barren point, under which lies the entrance of the Muchkundi River, only admitting coasters at H. W. **Pent**, the principal town, is just inside and to E. of the fort. **Paos Bay**, which is 6 m. N. by W. from Poranghur, is a snug and deep little cove, affording sheltered anchorage during N.-Westers in 4 or 5 fathoms, mud and sand. The town of Paos is about 3 m. up a little creek.

The coast between the two above places is rocky table-land, with 4 or 5 little sandy bays, and safe to approach into 5 fathoms. The land, at the back of Poranghur, Paos, and Ratnaghiri, gradually rises from the sea coast, in undulating hills, till at 5 or 6 m. distance it is from 600 to 700 ft. above the sea, but has no remarkable features. Hurchiri round wooded hill, 8 m. E.N.E. of Paos Bay, is 890 ft. high, and conspicuous at the back of the above land.

RAJAHPUR BAY, in lat. $16^{\circ} 37' N.$, bears from Ratnaghiri S. by E., distant 22 m., and it is 3 m. to N. of Viziadrog. It gives shelter to coasters from N.W. winds, and the river runs up to **Rajahpur**, a large town 15 m. up, but owing to the shallowness of the river, the native vessels discharge and load at **Jeytapore**, about 4 m. within the entrance. **Tulsunda Cove**, on the S. side of the bay, is a capital place of shelter for small vessels if overtaken by a S.W. gale.

Ambolghur Point and Reef lie about 1 m. to the N.W. of Rajahpur Point. Vessels should give a berth to the reef of sunken rocks (least water 5 or 6 ft.), by not shoaling under 8 fathoms, although the neighbouring coast is safe to approach into 6 fathoms.

VIZIADROOG, or GERIAH HARBOUR (the Fort Flag-staff in lat. $16^{\circ} 34' N.$, lon. $73^{\circ} 19' E.$), is an excellent place of shelter for large vessels during the S.W. monsoon, but only available in the day-time, as there is no light placed there yet. **Jygi Point**, the S. extreme of Viziadrog Bay, lies nearly 2 m. to S.W. of the fort, and is a projecting part of the coast, the land receding both to the N. and S. There is no bar at the entrance, the depths being from 3 to 6 fathoms, and from 2 to 3 fathoms inside, at L. W. Without a chart, no vessel could take up a good berth unless assisted by a native pilot. **Angria Bank** bears W. from Geriah, distant 24 leagues, and seems naturally placed as a **Direction Bank** for Viziadrog Harbour; it extends from lat. $16^{\circ} 18' N.$ to $16^{\circ} 39' N.$, being about 10 m. in breadth E. and W. The depths generally found on it have been from 12 to 15 fathoms rocky bottom, or hard ground; 12 fathoms was the least water that Captain Selby found in traversing it. It is steep all round; near its inner edge there is marked no bottom at 100 fathoms, and 7 m. off a cast of 115. then 49 fathoms at 12 m. distance, decreasing gradually towards the shore.

The **Fort of Viziadrog**, situated on a neck of rocky land, is of considerable extent; the walls have been very strong, but the work of decay is going on. The point, on which the Fort stands, forms the S. side of the river entrance; the upper level of the Fort is 100 ft., and the flag-staff 170 ft. above the sea. The land on the S. and S.W. being higher, hides the Fort from vessels coming from the S. This river is navigable at H. W. as far as **Wagotun** (at the foot of

the Phunda Ghaut) by vessels drawing 7 ft. Canoes can go up to Kariputtan, more than 20 m. from the mouth.

River Entrance. Though Viziadroog River is said to have no bar (a circumstance which may be attributed to the absence of sand along the coast to the N.), there is a flat to the E. of the Fort, on which the depth of water is a little less than will be found further in, the bottom clay and sand. This harbour is accessible to vessels during the S.W. monsoon; in the height of which, steamers of the Indian Navy conveyed troops there during the Indian mutiny, in 1857.

Anchorage. A vessel may run in boldly, and anchor in $3\frac{1}{2}$ fathoms, mud and clay, at L. W., with the extremes of the Fort bearing from W. to S.W. Further in than this position the wind would probably fail or be adverse, so it is better to warp further in at H. W., taking up a position abreast the town on the W. side of the river, $\frac{1}{2}$ m. S.E. of the Fort, moored head and stern, with the best bower to the ebb, which in the freshets runs at the rate of 4 knots an hour. The deep water is on the W. side of the river, and there is not room for a large vessel to swing, except at H. W. At the distance of 2 m. from the Fort, on the same side of the river, is an old dock, built by Angria, the pirate chief, many years ago; it appears excavated out of the rock, and was capable of receiving vessels of 500 tons, but is now almost filled up. In the fine season a ship may anchor in the bay anywhere as most convenient.

Tides. It is H. W. on F. and C., at 11 h.; springs rise 9 ft., neaps 5 ft. Night tides are higher than day tides in the N.E. monsoon, and the contrary in S.W. monsoon, during which stormy period you will find 2 or 3 ft. more water in the day time than is shown on the chart.

DEOGHUR, or DEUGHUR HARBOUR (N.W. bastion of the fort), in lat. $16^{\circ} 23\frac{1}{2}'$ N., lon. $73^{\circ} 21'$ E., bears about S.S.E. from Geriah Point, distant 4 leagues; the coast between them is bold, having 8 and 9 fathoms within less than a mile of the shore. This Harbour has 3 fathoms water in it, where a ship might lie sheltered during the S.W. monsoon, and is formed close under the N.E. point of the high peninsula, on which the fort is situated; this peninsula is on the S. side of the river entrance, and appears as part of the main, being nearly joined to it. **Rocks** project a considerable distance from the N. point of the entrance, and a ship running in for shelter or otherwise, should, after getting into 7 fathoms, borrow near the Fort Point, round it within a cable's length, and anchor under it in 3 fathoms, mud (L. W. depth), with the point bearing about W.N.W. The river is broad at the entrance, and is said to extend a great way inland, but the passage into the Harbour is only 3 cables wide. H. W. on F. and C., at 11 h.; rise and fall about 9 ft. at spring tides, and 5 ft. at neaps.

Atchera River, or Achre, in lat. $16^{\circ} 11'$ N., bears S. by E. $\frac{1}{2}$ E. from Dewghur River about 4 leagues; it can be entered by very small vessels, there being 7 and 8 ft. water at H. W. on the bar. On the S. side there is a sandy shore to Sirjakot, and the N. side of the entrance is level table-land, by which this place may be known, being 150 to 180 ft. high. The coast here is safe to approach within a mile of the shore, or to 5 fathoms, as far as 5 m. to S. of Atchera; but beyond that, or bearing S. by E. 6 m. from the river, stands a low black rock, called **Koora Islet**, with sunken rocks round it. Sirjakot River (running up to the large town of Muscoore) lies $1\frac{1}{2}$ m. to the S.E. of Koora.

MELUNDY ISLAND, or SINDUDROOG, in lat. $16^{\circ} 2'$ N., lon. $73^{\circ} 27'$ E., about 3 leagues S. $\frac{1}{2}$ E. from Atchera River, is fortified, but being low, not easily distinguished from the offing; to the S., straggling rocks extend 3 m. off shore, towards Newtee Point. Malwan is a fort on the main land near it, and between them is the little **Port of Malwan**, which used formerly to protect the cruel horde of pirates, who, issuing from this place, were the dread of defenceless trading vessels. In passing this place, a large ship should not come under 13 fathoms, for 11 fathoms is close to the edge of foul ground. The small steamer *Johnston Castle* in 1865 was totally wrecked on a **sunken rock**, lying $\frac{1}{2}$ m. to W. by S. of the N. end of Melundy. A buoy was placed to mark the rock.

Malwan Point is a slightly-elevated rocky cape covered with cocoa-nut trees to the N. of Melundy. With a S. wind blowing, boats can land in the little bay to the N. of this headland, near to the Collector's cutcherry; but, with N.W. winds, the landing is best in the little harbour of Malwan; a native boat will pilot you in.

Anchorage. Do not anchor in a large ship in less than 8 fathoms, abreast of this port. Coming from the S., do not steer in for the place until the N. end of Melundy bears E., and anchor with it a little to the S. of that bearing. For 2 m. to the S.W. of Melundy the bottom is foul, rocky, with great overfalls in the soundings, and undiscovered rocks may exist there. The smallest vessel should not shoal under 10 fathoms off this foul ground of Melundy and Karli.

Karli River Mouth, on the sandy shore, 2 m. N.N.W. of Nuti Point, is only available for small boats, with a native pilot. Off it are several islets, and a great extent of foul ground. Karli Town is a little way inside the river mouth. The S. extreme of Karli foul ground (4 fathoms, rocky) lies $2\frac{1}{2}$ m. to S.S.E. of **Square Rock** (a rock 40 ft. high), the W. visible danger of the

Karli group of rocks, which is $4\frac{1}{2}$ m. to N.W. of Nuti Point, and $3\frac{1}{2}$ m. to N. of the N. Vingorla Rock. **Karli-ka-chal Passage**, between the N. Vingorla Rock (to sea-ward), and the Karli foul ground and Nuti Point on the main land, is $\frac{1}{2}$ m. broad, having depths of 9 fathoms, but a stranger should not attempt it. The leading mark through, in coming from the N., is all Tiger Hill open to the S. of Nuti Point, bearing about E. by S.: and when all the Burnt Islands and rocks bear to the W. of S., the vessel should haul gradually to the S.E., to avoid Babra Rock, $\frac{1}{2}$ m. off Nuti Point, and then steer direct for Vingorla Beacon.

NEWTEE, or NUTI POINT (the Fort), in lat. $15^{\circ} 56' N.$, lon. $73^{\circ} 30' E.$, $6\frac{1}{2}$ m. S.S.E. from Melundy, is directly opposite to the Vingorla Rocks; and bears N.W. $\frac{1}{2}$ W. 8 m. from Vingorla Beacon; the intervening coast forms a deep bight, with several rocky capes and sandy bays, which are perfectly safe to approach into 6 fathoms, water. Nuti Fort overlooks the Point, at an elevation of 150 ft., and at the back of this is high land 500 ft. above the sea. At $\frac{1}{2}$ m. to S.W. of the Point is a **sunken rock**, called Babra, which is the only danger on the Nuti side of the channel.

The **N. Vingorla Rock**, called **Karil**, bearing W. $\frac{1}{2}$ S. 3 m. from Nuti Point, is a peaked islet, 70 ft. high, and safe to approach on its N. side within $\frac{1}{2}$ m., where there is a depth of 9 fathoms. But, nearly $\frac{1}{2}$ m. E. of it, there is a **rock awash**, which is the W. danger in the channel, called by the native boatmen Karli-ka-chal, between Nuti Point and the islands.

VINGORLA ROCKS, or Burnt Islands, a group of islets and sunken rocks, extending 3 m. in a N. and S. direction, and more than a mile E. and W., are situated some distance to the S.W. of Nuti Point, and 9 m. W.N.W. of Vingorla. The highest is a conical island, 180 ft. above the sea; but the S. one is the largest, though of rather less elevation, and from this the N. one bears N. distant 3 m. The S.W. islets, bearing W. by N. a little N. from Vingorla Beacon, $9\frac{1}{2}$ to $9\frac{3}{4}$ m., are four separate black rocks, about 50 ft. above the water, and on one of these a light-house has been built. There is a little sunken rock a cable's length to the S., but none to the W. of them. They are deep-to, 12 fathoms being close, and 15 fathoms at 1 m. off. A ship passing the Vingorla Rocks at night should not come under 17 fathoms. These rocks afford good protection from N.W. winds, during which ships may anchor anywhere to leeward of them, in from 12 to 11 fathoms, mud, at L. W., remembering that the rise of tide at springs is $1\frac{1}{2}$ fathoms nearly, and at neaps 1 fathom nearly. There is plenty of water in the passage between them and Nuti Point; but, as there is a sunken rock on either side of the channel, sailing ships had better avoid it. The ship *Margaret*, working through this channel, struck on a rock, which made it necessary to put her under a complete repair on her arrival at Bombay.

Light. The S.W. Vingorla Rock, in lat. $15^{\circ} 53' N.$, lon. $73^{\circ} 27' E.$, now exhibits a *fixed* white light, elevated 110 ft., and visible 15 m. Vessels should not round too closely these rocks at night, on account of a **sunken rock**, lying nearly 2 cables to S.E. of the light.

VINGORLA BEACON, in lat. $15^{\circ} 51' N.$, lon. $73^{\circ} 36' E.$, bearing N. by W. $\frac{1}{2}$ W., 7 m. from Raree Point, and E. by S. from the S. extreme of the Burnt Islands, is a white pyramid on the S. brow of a hill, overlooking the point and creek, at an elevation of 250 ft. above the sea. Vingorla, or Engurla Town, is 1 m. E. of the mouth of the creek, and the camp is 1 m. further inland. This is now a place of considerable traffic, being the sea-port of the Belgaum district, to which it is connected by good roads. Troops, moving to and from the S. Mahratta country, are embarked and landed at this port. Fresh water is obtainable at a spring just within the entrance of the creek. Vingorla now contains about 5,000 inhabitants: it has a tolerably good bazar, and an increasing number of merchants. It was formerly one of the retreats of the numerous sanguinary pirates who infested this coast, until, in 1812 it was ceded by the chief of Sawunt Wari to the E. I. C.

In the little bay, formed by Vingorla Point, small native vessels find shelter from N.W. winds, and (at H. W.) are enabled to discharge cargo under a crane on a stone wharf. There are several patches of rock about this anchorage, and in the roadstead. At $\frac{1}{2}$ m. due S. of the Beacon, lies one patch having $3\frac{1}{2}$ fathoms water over it, and $2\frac{1}{2}$ cables' lengths E.N.E. of this is another rock having 3 fathoms on it. During the periodical fresh S. breezes which occur, for two or three days at a time, in the fine season the little traders that cannot get into Vingorla Creek, make a fair wind of it, and run up to Malwan or Melundi Harbour for shelter.

From Vingorla Creek to the S. is a sandy shore for 2 m. to Machlimar, or Porpoise Point, about 200 ft. above the sea, from which the table hills extend in a crescent right round the E. side of Vingorla camp, and join the Beacon Hill. A conspicuous wooded hill, 1,000 ft. high, called Wagh Ghiri, or the Tiger Hill, stands E.N.E. 5 m. from Vingorla. Half-way between Vingorla and Raree Point, the sandy coast is interrupted by Machlimar Point and Creek, the shore is safe to approach into 5 fathoms mud; but not within 7 fathoms off Raree.

Lights. By Vingorla Beacon, two *fixed* lights (20 ft. apart) are now shown, at an elevation of

250 ft. above sea, visible 9 m.; but in the S.W. monsoon, from mid-June till end of August, they are not exhibited, the port being then inaccessible.

Anchorage. Large vessels must (as a general rule) anchor in $5\frac{1}{2}$ fathoms, mud, rather less than a mile from the beacon bearing N.N.E.; but trooping steamers may, in fine weather, take up a berth in 4 fathoms at L. W., between 2 and 3 cables' lengths S. by E. of the house on the point, avoiding the above-mentioned rocks, but at night they should move further out.

Tides. It is H. W. on F. and C. at Vingorla at 11 h.; springs rise 8 ft., neaps 5 ft.

RAREE POINT (the Fort), in lat. $15^{\circ} 45' N.$, bears about S.S.E. $\frac{1}{2}$ E. from Newtee, distant 14 m.; the coast between them is safe to approach, having a sandy beach and irregular soundings within a mile of the shore; and about mid-way is the small river Vingorla. Raree Fort, being situated on an eminence near the Point, is conspicuous from sea-ward; several rocks project from the Point to the W., two of them above water lie to the S.W. of it more than a mile distant.

Raree Outer Rock, in lat. $15^{\circ} 44' N.$, lon. $73^{\circ} 38' E.$, is 36 ft. high, having 6 fathoms close-to, and 4 to 2 fathoms inside. On the N. side of the Point there is a small river, navigable by small boats. In the night, ships should come no nearer to this place than 10 fathoms. In the day no vessel should round Raree Outer Rock within 1 m.; the *General Havelock* was lost, at the close of 1872, on *sunken rocks* about 1 m. to S. by E. of it.

TIRACOL, or CHIRACOLE FORT, in lat. $15^{\circ} 43' N.$, lon. $73^{\circ} 40\frac{1}{2}' E.$, and $2\frac{1}{2}$ m. to the E. by S. of Raree Outer Rock, stands on the brow of the hill on the N. side of a small river, but is not conspicuous. This river is the boundary between British and Portuguese territory. **Banda**, a town of Sawunt Wari, is on British side. Pernem, on the left bank, belongs to Portugal.

GOA TERRITORY BELONGING TO PORTUGAL.

The Coast of Goa is so well defined by the outlying islands, and many white churches on the hills, as to require no further description than is below given: Bori mountain 16 m. due E. of St. George's Islands, is a round mount, distinct from any others, and about 1,500 ft. high, having some trees looking like a black wall on the summit. To the N. of Agoada promontory the coast is sandy for 4 m., then come two rocky capes, with a sandy bay between them; then another sandy bay, beyond which is Chapra Fort and river. The coast to the N. of Chapra is sandy for 5 m., but interrupted about midway by two little rocky capes, between which and Tiracol are some rocky patches $\frac{1}{2}$ m. off shore. To the N. of this sandy shore is a rocky cape, and then for $\frac{1}{2}$ m., sand, which forms the S. bank of Tiracol, or Pernem River.

TIRACOL FORT, in lat. $15^{\circ} 43' N.$, lon. $73^{\circ} 40\frac{1}{2}' E.$, standing on the brow of a hill, on the N. side of the river entrance, is the N. limit of the Goa territory, and 6 m. N. of Chapra; the little area of the fort and 1 m. round it being all that belongs to the Portuguese on the N. side of this river, which has 8 or 9 ft. at L. W. in its narrow entrance; there are rocks to the W. of the river mouth, but a vessel may anchor with the fort bearing N.E., in 5 fathoms, mud, 1 m. off shore.

Chapra, or Chapora Fort, in lat. $15^{\circ} 36' N.$, and 7 m. to S.S.E. of Tiracol, is on the S. side of the entrance to Chapra River, which is a considerable stream, running many miles inland, but the mouth having a bar can be only entered by small coasters. The fort is on a high bluff point, 8 m. N.N.W. of Agoada Point, and its black walls are easily discerned. The land adjacent to the sea on the S. side is hilly, but the N. side of the river mouth is sandy, with cocoa-nut trees.

Agoada, or Alguada Point, in lat. $15^{\circ} 29\frac{1}{2}' N.$, lon. $73^{\circ} 45' E.$, forming the N. extreme of Goa Bay, is a level headland, upwards of 200 ft. high, and fortified along the sea margin; with a revolving light, bearing about S.S.E., and 8 m. from Chapra Fort.

GOA BAY and HARBOUR. This place, the capital and principal sea-port of the Portuguese possessions in the East Indies, has not such deep water as formerly in the bay, though the depth on the river bar is the same as represented on charts executed half a century ago. Shelter for small vessels from N.W. winds, is to be had to the S.E. of the light-house and landing-pier, in about 4 fathoms at L. W., about 3 cables' lengths from the rocky shore. Inside of 5 fathoms the bottom is mixed sand and mud, but outside of that depth there is mud. Saokari Creek, round the E. end of Agoada table-land, is an excellent little refuge for small coasters. **Agoada Point**, $4\frac{1}{2}$ m. N. by W. of Marmagao, and more than 8 m. N. of St. George's Islands, is a level headland, above 200 ft. in height, fortified around the base, and on the top where there is a light-house. **Reis Magos Fort** is on the S.E. extremity of a large piece of table-land, and 2 m. E. by N. of Agoada Light-house, and $\frac{1}{2}$ m. to N. of Gaspar Dias Fort.

Nossa Senhora da Cabo (formerly a monastery, but now a residence of the Governor-General of Goa) is a white building on a cape between Marmagao and Agoada, and generally spoken of as Cabo. A bay is formed between it and Gaspar Dias, a fort on the sandy shore $1\frac{1}{2}$ m. to the N.E.

of Cabo. **Cabo Reef**, which the tide covers and uncovers, extends $\frac{1}{2}$ m. off, but foul ground nearly 1 m. off the Cape; and at the distance of $1\frac{1}{2}$ m. S. of this are the Sunchi Shoals.

Panjim, or New Goa, the capital of the Portuguese dominions, is $1\frac{1}{2}$ m. N.E. of Gaspar Dias Fort, on the left or S. bank of the river; it has 1 m. of river frontage, and contains many excellent buildings: palace, barracks, hospital, and market. The banyan tree (the pilot's mark), is above the church on the N. end of the hills at the back of Panjim, and has a semaphore near it. The population of Panjim is about 10,000 souls; that of Goa territory being returned at 313,262; of this number two-thirds are stated to be Roman Catholics. Panjim is now the seat of Government.

Goa City, situated on the S. bank of the river, about 5 m. above Panjim, is now nothing but a heap of ruins, with a dozen churches, more or less in ruins, standing out from among the trees and on the hills; the place is very unhealthy. Midway between it and Panjim is the pretty little town of Raibanda, separated from Panjim by a salt marsh, over which there is an excellent causeway, which forms the high road from Old Goa to Panjim (New Goa).

Supplies. Ships always water at Agoada after going out of the river, but at Panjim all kinds of fresh provisions and poultry may be obtained. Rice, pepper, cocoa-nuts, betel-nuts, and salt, are the chief products; a good deal of cotton is now brought down the mountain passes into Goa, from the Belgaum district.

LIGHT. The light-house, in lat. $15^{\circ} 29\frac{1}{4}'$ N. lon. $73^{\circ} 45\frac{1}{4}'$ E., is a white round tower on the upper fort, exhibiting a light, *revolving* once in seven minutes, at an elevation of 280 ft. above the sea; but not having powerful reflectors this light could not be seen often beyond 12 m., and less in hazy weather. Near the light-house are a flag-staff and semaphore, and on the beach to E. of them is an excellent stone landing-place, close by which is a well of good fresh water, from which shipping are supplied on application to the port authorities.

Anchorage. The common anchorage for large ships is abreast the fort, in 5 fathoms, mud, with the light-house bearing N. about $\frac{1}{2}$ m. from shore; but small vessels may go in much nearer to $3\frac{1}{2}$ fathoms, mud, with light-house N.W., and the E. cocoa-nut point of Agoada N.E. by E. The bay is doubtless a little shallower than it was 50 years ago. Some rocks, mostly above water, project a small distance sea-ward from Agoada S.W. point, but this side of the bay is safer to borrow on than Cabo. After the early part of May, it was considered unsafe to remain at Agoada anchorage, it was usual then for the Portuguese to send their large ships, that could not go into the river of Goa, down to Marmagao, where they found shelter by mooring close under the fort walls of that peninsula; but even there, in the height of the S.W. monsoon, a swell rolls in round the point, rendering it necessary to moor the vessel, head and stern, so as always to have her bow to the swell.

Tides. It is H. W. throughout the Bay of Goa, on F. and C., at 10 h. 30 m.; the rise and fall at ordinary springs is 7 ft.; extraordinary springs rise 8 ft.; and ordinary neaps 4 ft. There is very little stream of tides in the roads, though in the river entrance it is strong.

DIRECTIONS. The bar at the Goa River entrance, $1\frac{1}{2}$ m. E.S.E. of the light-house, and near a white fort on the sandy beach called Gaspar Dias, has 13 ft. at L. W. in the fine season; but in the S. W. monsoon heavy breakers extend right across the bay, and the river mouth is sealed up. There are *said to be* patches of rock on the sides of the entrance, and no vessel ought to enter without a pilot; indeed the regulations of the port insist on every vessel's taking a Government pilot, who will board the vessel from Agoada. There are good marks for entering Goa River, and the same have existed for 50 years, showing thereby that the channel remains the same.

To enter the river, steer E. towards Gaspar Dias; and after St. George's Islands have disappeared behind Cabo, bring the banyan tree on Panjim Hill on with Pilot's brow, the red brow of a hill $\frac{1}{2}$ m. nearer than Panjim, and steer for them about E.N.E. When the pilot's double-headed tree (seen to the N. above the cocoa-nut trees), comes out from behind the E. cocoa-nut point of Agoada land, bearing N.W. by N., a vessel is close to the bar. Stand on about E.N.E. or E. by N., according to tide, keeping the Panjim banyan tree partly hidden behind Pilot's Brow, which mark leads you right in till abreast of Gaspar Dias Fort. Should you open out the whole of the banyan tree, the vessel may get upon the N. sands; and if it entirely disappears behind the red brow of the hill, she may get on the S. sands. The vessel having thus brought Gaspar Dias to bear S.S.E., may then stand on E.N.E. and anchor in "*the well*," which has a depth of 4 fathoms at L. W., is 3 cables to the S.W. of the E. fishing stake, and 3 cables' lengths to the N.N.E. of Gaspar Dias Fort. Or, if the wind will admit, she may haul up to the N. for Reis Fort, passing to the W. of the fishing stakes; she must keep close to the Reis shore, after passing the Fort, till past the Reis sand, which lies in the middle of the river; then, paying attention to the tide, she may gradually keep away to the E. towards Panjim, off which the shipping lie in 4 fathoms at L. W.

MARMAGAO, or MARMAGOA PENINSULA, is a level piece of land, appearing like an island, nearly of equal height to that of Alguada and Nossa Senhora de la Cabo. It breaks off

almost perpendicularly at both ends, the N. point being that called Marmagao Point, and is $4\frac{1}{2}$ m. to the S. of Alguada.

Marmagao Point is nearly 3 m. to the S. of Cabo, and its N.W. extreme is 4 m. N. by E. $\frac{1}{2}$ E. from the W. St. George's Island. On the N.E. side of Marmagao Promontory (which is nearly 2 m. long, N.W. and S.E., and connected by a sandy neck to the other high land), small frigates used formerly, during all the S.W. monsoon, in years gone by, to lie moored head and stern, in $3\frac{1}{2}$ fathoms, at L. W., at 2 cables' lengths off shore. In 1857, troops were landed there by Indian Navy steamers during that stormy season.

The Buffalo Rock or Camberi, part of which stands up above water, lies nearly 1 m. to the S.W. of Marmagao Point, and has 5 and 6 fathoms round it. To the N. of it, and at 4 cables' lengths off, is a 3-fathom rocky patch, which a vessel running into Marmagao must remember.

Marmagao Roads. The N. side of Marmagao Point is bluff and steep-to, having 5 fathoms close to the rocky shore, and a vessel must borrow on this, by keeping about 2 cables off, to avoid the Amee Shoal, which narrows the passage to less than $\frac{1}{2}$ m. To sail into Marmagao Road, in coming from the N., give a good berth to Cabo Reef, by not bringing the Buffalo Rock farther to the W. than on with the E. extreme of the middle or largest St. George Island, or between Secretario Island and the largest island, which will lead clear of Sunchee Rocks, with 12 to 18 ft. thereon, situated on the S.W. extreme of Cabo Reef, about $1\frac{1}{2}$ m. distant from the Cape. Steer to the S. to pass outside of Amee Shoal (which has 3 fathoms only, and lies $1\frac{1}{2}$ m. to N. by W. of Marmagao Point), by keeping at least a part of Secretario Island to the S. in sight outside of all Marmagao peninsula, until Rasseen Hill is on with the N. extreme of Ignacio Island up the river, which is the leading mark till up with Marmagao Point; or if Rasseen Hill is not seen, steer to the E., keeping Chicklee Point on with the centre of Ignacio Island, the other half of the island being shut in; and after passing the N. point of Marmagao, steer E. for the Roads, and anchor in 4 or $3\frac{1}{2}$ fathoms (L. W. depth), with the flag-staff on the Hill bearing about S.W. by W. to W.S.W., within $\frac{1}{2}$ m. of the fort.

If a ship be disabled, and obliged to run for Marmagao Road in the S.W. monsoon, when thick weather prevents the marks from being seen, or if those on board are unacquainted with the place, observe, that the outer part of the peninsula of Marmagao is $3\frac{1}{2}$ m. N. by E. $\frac{1}{2}$ E. from the outermost St. George Island, and that the peninsula has a 3-fathom shoal fronting it at the distance of less than $\frac{1}{2}$ m., which shoal is about the same distance N. $\frac{1}{2}$ E. from the Buffalo Rock, having close to it $5\frac{1}{2}$ fathoms all around. Amee Shoal, having also 3 fathoms rocks on it, bears N. by W. from the outer point of Marmagao $1\frac{1}{2}$ m., and between these two shoals is the fair channel leading to the Road, with depths in it generally from 5 to 6 fathoms, soft mud. When St. George Islands are seen, steer for the N.W. point of Marmagao, taking care not to approach it nearer than a mile till it bears to the E. of E.N.E.; and when the point is bearing any way between E. by N. and S.E. the channel is open, and a ship may steer directly towards it, then sail along the shore in 5 or $4\frac{1}{2}$ fathoms to the anchorage in Marmagao Road. Here supplies of various kinds may be got from the Arsenal of Goa, which in the S.W. monsoon are brought round by an inland navigation, as the bar of Goa River cannot be passed with safety in this season. Marmagao Flag-staff is in lat. $15^{\circ} 24\frac{1}{2}'$ N., lon. $73^{\circ} 46\frac{1}{2}'$ E.

ST. GEORGE'S ISLANDS are indeed one island, nearly severed by a narrow neck of sand and shingle. The W. portion, or what is usually called the outer island, is a high cone, 250 ft. above the sea; and the E. part is wedge-shaped, its highest elevation being at its E. extreme, where it is 200 ft. above the sea. In length E. and W. they extend more than a mile, but are quite narrow in a N. and S. direction. To the S.E. of them vessels will find excellent shelter from N.W. winds, in 10 or 11 fathoms, mud, but not too near to the islands, for off them lie several rocks, level with the water's edge; and at $\frac{1}{2}$ m. to E., there is a patch of rocks, dry at L. W.

The Sail Rock, $\frac{1}{2}$ m. S. of the W. or conical island, is about 40 ft. out of water, and may be easily from a little distance mistaken for a vessel. To the E. of the Sail Rock, and between it and the islands, there are rocky patches.

The Outer, or W. St. George's Island, in lat. $15^{\circ} 21'$ N., lon. $73^{\circ} 45'$ E., bears N.N.W. $\frac{1}{2}$ W. $18\frac{1}{2}$ m. from Cape Ramas, and $6\frac{1}{2}$ m. W. by S. of Col Bay; it is 8 m. to S. of Agoada Light-house. Extending to some distance on the N. of these islands there is a flat, the bottom of which is sand and rocky, with overfalls from 7 to 4 fathoms, and less water in one or two places, so that the channel between them and Secretario Island, (formerly called the E. St. George's Island, but it belongs to the Portuguese), though $1\frac{1}{2}$ m. in width, is not recommended, although close to Secretario Island there is a good depth of water.

St. George's Islands are in the line of 10 fathoms water, and have 12 fathoms close to the S.

of them. There is 20 fathoms at the distance of 6 or 7 m. to the W., and 30 fathoms at 15 to 17 m., the bottom being mud; but outside of 30 fathoms it is generally sand or rock.

The Coast of Goa, below Marmagao peninsula, forms in several rocky headlands to Colla Bay (pronounced Col), thence it is a perfectly straight sandy shore for nearly 15 m. to the mouth of the Salset or Margao River, from which Cape Ramas bears S.W. by S. distant 4 m. Col or Colla is a town in a little bay at the N. extreme of the above long sandy shore, and 18½ m. N. by W. of Cape Ramas; Col Bay affords excellent shelter from N.W. winds, having deep and very smooth water. To the W. of Col Bay there are several rocky capes, and sandy bays, for 5 or 6 m., to Marmagao Point. Chandernat, a white pagoda, on a pretty hill 900 ft. above the sea, is situated about 6½ m. to the N.E. of Margao River mouth. The coast is perfectly safe to approach into 5 fathoms water, which depth is 1 m. off shore.

CAPE RAMAS, or **Cabo de Ram**, in lat. 15° 5' N., lon. 73° 54' E., bears about S.S.E. from Marmagao Point, distant 7 leagues; the coast between them is low and woody, with a sandy beach and some Portuguese churches, the soundings regular, and the shore safe to approach to 7 or 9 fathoms, except near the St. George's Islands: the country is high inland. Four miles to the N.E. of the Cape is the entrance of Salset River, having a bar with 8 or 9 ft. water in the channel, inside of which the river separates into two branches; that extending to the N.E. is said to join the inlet that divides Goa Island from Marmagao Point, by which this part of the coast has generally been called Salset Island, or Marmagao-Salset. Cape Ramas is a high, bluff headland, forming in two level points when seen either from the N. or S.; that called the False Cape is highest, and first discernible, from 700 to 1,400 ft. high; the other, less elevated, 200 ft. high, forms the extremity of the True Cape, on which is a small fort belonging to the Portuguese. The soundings about the Cape are very regular over a soft bottom, and it is steep-to, having within a mile of the extreme point 9 fathoms, mud; it projects considerably, by which a large bay is formed on each side; that on the S. side affords shelter to small coasters from northerly winds.

Between Cape Ramas and Loliem Point, the N. extreme of Carwar Bay, the coast is undulating, forming several bays, unfit for shipping; the soundings are regular to 6 or 7 fathoms, from 1½ to 2 m. off shore. **Paidegal Point** is a steep, projecting rocky headland, 3½ m. N.W. of Talpon River. Paidegal village is on the N. side of the headland, above which the coast is sandy for 1½ m., then rocky to Cape Ramas. The coast N. of Loliem Point trends due N. for 4 m. to the Talpon River, and three capes with three sandy bays intervene; in the middle bay is another small river. Above Talpon is the town of **Canacon**, the capital of the district of that name, and a military station. Off the sandy bay of Canacon, and S. of a little rocky island, is good shelter against N.-Westers for small vessels, in 3 or 4 fathoms, mud.

Loliem Point, in lat. 14° 55' N., about 12 m. to the S.E. of Cape Ramas, forms the N. extreme of Carwar Bay. It belongs to the Portuguese, whose frontier town, called **Polem**, lies about 2½ m. to the E. of Loliem Point.

COAST OF CANARA.

This coast extends from the N. part of Carwar Bay nearly to Mount Delly, and the N. portion, down to Batkul, is subject to Bombay. The outermost Oyster Rock bears from Cape Ramas S.S.E. ½ E., distant 5½ leagues, and is 2½ m. to the W.N.W. of Carwar Head. This headland, in lat. 14° 48½' N., lon. 74° 5' E., is 640 ft. high, and conspicuous in coming from the S; it projects considerably, by which Carwar Bay is formed to the N., extending from Carwar Head 1½ m. to the N., and about 2 m. deep, having regular soundings in it from 6 to 4 fathoms. To the E. of Deoghur and Coormaghur Islets is the Fort of Sedashigur, within the entrance of the river. **Carwar** or **Carwad**, or **Cadavand**, the old E. I. C. factory, was farther up the river on the E. side. Beitkul Cove is now the site of the port of Carwar or Sedashigar.

CARWAR PORT, known also as **Beitkul Cove**,* a small but safe haven, where the India-men used formerly to careen, lies to the N. and E. of Carwar Head. At the mouth of this cove, and along the N. cliff of Carwar Head, vessels can lie in 4 fathoms at L. W., facing the W.N.W. swell, and moored head and stern, at the distance of 2 cables' lengths from the shore, sufficiently sheltered from the S.W. monsoon to enable them to load or discharge cargo. A new town, Konay, has been built on the N.E. of the cove. Godhully Peak, 1,800 ft. above the sea, bearing E. by S. 4 m. from Carwar Head, is the highest mountain by Sedashigar, being visible 40 m. off in clear weather; 1 m. E. of it there is another of rather less elevation. **Sedashigar Town**, which is a small military station, being on the British frontier, lies on the N. bank of the river, on the N.E.

* See Admiralty Chart, Sedashigur Bay, by A. D. Taylor, No. 242; scale, m. = 2 inches.

side of the old hill fort, called Sedashivaguddu, just inside the river entrance, and 3 m. N.N.E. of Beikul Cove. This fort was founded by Sedashwa Rao, one of the rajahs of Soonda, in the year 1564. There are two or three bungalows on the old hill fort, the S. end of which is a steep bluff, elevated 300 ft. above H. W. mark.

Carwar Head, in lat. $14^{\circ} 48' \text{ N.}$, lon. $74^{\circ} 4' \text{ E.}$, is 3 m. N.N.W. of Anjideva, and $2\frac{1}{2}$ m. N.W. of Binghi Point, one little rocky cape and two sandy bays intervening. Rather more than $\frac{1}{2}$ m. to the S.W. of Carwar Head there is a round rocky island, called on the charts Elephant Island, between which and the Head is a perfectly safe channel. The town of Carwar or Carwad, or Cada-vaud, where formerly was situated a large factory of the late East India Company, lies up a creek which runs into Sedashigar River, and is $3\frac{1}{2}$ m. to the N.E. of Beikul Cove. Carwar Head, which should properly be called **Beikkul Head**, by which name it is known to the natives, is in its highest part 650 ft. above the sea, a magnificent headland, and very steep-to, having 6 fathoms water close to the cliffs; it forms the S. boundary of Sedashigar Bay, of which Loliem Point, $6\frac{1}{2}$ m. to the N.N.W., is the northern limit. The Bay of Carwar, between these points, is thus nearly 7 m. long, and more than 2 m. deep, having a depth of 6 fathoms on the line between its extreme points, and gradually decreasing towards the bottom of the bight.

The **Kali Nadi**, or Sedashigar River, lies behind the islands in the middle of the bay; its entrance, when surveyed in 1855, was to the N. of the two islands, Curmaghur and Sungiri: but in 1857 the river burst out to the E. of these islands, and $2\frac{1}{2}$ m. N. of Beikul Cove, at the spot where its mouth was sixty years ago; it is probable, therefore, that it will again work up northward. On account of this frequent alteration of the river mouth, no special directions for entering can be given, but large ships may occasionally be able to enter, if assisted by a steam-tug.

Islands. **Sunghiri Island**, called also Deoghur, or Buffalo, 120 ft. high, is nearly 2 m. N. of Carwar Head; the fishermen grow a little hemp on its top, but it is difficult of access, being very steep. **Curmaghur Island**, 3 cables' lengths to the N.E. of Sunghiri, is elevated 180 ft. in its centre. This island has been fortified all round, and much of the work remains in good condition to this day; on the E. side, within the fort, is a well of fresh water amongst some trees. To the E. of this island the water is quite shoal, the sand being deposited in the still water to leeward of it. Between Curmaghur and Sunghiri is a safe passage, but a vessel should borrow on the former, as there are rocky patches off the E. end of the latter. **Kumbay**, or Black Rock, is an islet standing in 4 or 5 fathoms water at the distance of 4 m. N. of the Oyster Rocks; the space between them is perfectly safe; but at $1\frac{1}{2}$ m. to sea-ward, or W.N.W. of Black Rock, there is a dangerous little table rock, to be presently described.

The **Oyster Rocks**, the most sea-ward land-mark of Sedashigar Bay, are a cluster of islands, covering the space of 1 m. in length, E. and W.; the N.W. one, the highest, is 160 ft. above the sea, and has a depth of 7 fathoms water 2 cables' lengths off it. A light-house is now erected on this, in lat. $14^{\circ} 49' \text{ N.}$ and lon. $74^{\circ} 3' \text{ E.}$, and vessels may anchor to the E.N.E. of these rocky islands, during the S.W. monsoon, in smooth water. This highest Oyster Rock is 2 m. W.N.W. of Carwar Head, and the fair channel between them is more than 1 m. broad.

Elephant Island, a round, high island, lying $\frac{1}{2}$ m. to S.W. of Carwar Head, and $1\frac{1}{2}$ m. to S.E. of the Oyster Rocks, forms the S. side of this channel. A rock awash at L.W., lying 2 cables to the E. of all the visible Oyster Rocks, must be avoided when running in during the fine season; to do this, the summit of Madhully Hill (to the N.W. of Sedashigur Hill) must not be seen to the left of the summit of Curmaghur.

Shoals. A **sunken rock**, with 14 ft. on it at L. W., lies between the Oyster Rocks and Elephant Islet, with the light-house bearing N.W. $\frac{1}{2}$ N., distant rather over $1\frac{1}{2}$ m.; Elephant Islet E.S.E., 6 $\frac{1}{2}$ cables; and the W. ends of Deoghur and Curmaghur Islands nearly in a line, about N.N.E. A red buoy marks its N.W. side. A **shoal**, about 50 yards in length N. and S., and 20 yards E. and W., with $2\frac{1}{2}$ fathoms on it at L. W., over rocky bottom and shells, lies to the N.W. of the Oyster Rocks, with the light-house bearing S.E. $\frac{1}{2}$ E., distant $2\frac{1}{2}$ m.; Curmaghur Island E. $\frac{1}{2}$ S.; and Black Rock N.N.E. $\frac{1}{2}$ E. There are 10 fathoms all round this shoal. A red buoy marks the W. side of it; vessels should not approach within a cable's length. This is most likely the sunken rock mentioned in early editions of this Directory, as lying 3 or 4 m. to N.W. of the largest Oyster Rock. A **Sunken Rock**, scarcely a boat's length across, and nearly awash at L. W. springs, lies in $5\frac{1}{2}$ fathoms, nearly 1 m. S. by W. of Loliem Point, and 5 m. to N. by W. of the Oyster Rocks. When close to this rock, Godhully Peak is in line with the left extreme or N.E. side of Curmaghur Island; therefore, a vessel should give the rock a wide berth, by keeping that peak to the right of that island.

Loliem Point, the N. extreme of Sedashigur Bay, and belonging to the Portuguese, is a steep, rocky cape, well wooded, more than 300 ft. high, and increasing in height to the E. In a little

sandy bay, $2\frac{1}{2}$ m. E. of the Point, is the village of **Polem** (pronounced Polay), which is the border town of the Portuguese, and has a custom house with a military guard. The boundary line between Portuguese and British territory passes eastward from Polem through the summit of a round hill, called Bomguda, between 6 and 7 m. E. of Loliem Point. The sunken rock, described as nearly 1 m. S. by W. of Loliem Point, bears from the highest Oyster Rock N. by W., distant 5 m.

LIGHT. A dioptric, one of the first order, has been placed on the Oyster Rocks. It is a *fixed* white light, at an elevation of 205 ft. above mean level of sea, and in clear weather should be seen 20 m. The tower is round, of white granite, 40 ft. high, standing on the summit of the largest or N.W. Oyster Rock, in lat. $14^{\circ} 49' N.$, lon. $74^{\circ} 3' E.$

Tides. It is H. W. in Sedashigur Bay, on E. and C., about 10 h. Ordinary springs rise $6\frac{1}{2}$ ft.; extraordinary springs with the night tide in the fine season rise 8 ft.; neaps $3\frac{1}{2}$ to 4 ft.

Anchorage. Vessels may anchor on the S. side of the Oyster Rocks, during N.-Westers, in 7 fathoms, mud, at the distance of 3 or 4 cables' lengths from the rocks, with the W. islet W. $\frac{1}{2}$ N., and Curmaghur open to the right of all the Oyster Rocks. Sailing vessels making the port at night should anchor in about 8 fathoms water, near the Oyster Rocks Light, and wait for daylight. The inner anchorage of Beitkul Cove is marked by a white buoy, 3 or 4 cables from the shore. Steer for this *in a line with* the Collector's bungalow on Konay Hill, about E.S.E., and anchor in 4 or 5 fathoms, mud bottom. **By night**, a *red* light is exhibited at the Port Officer's house on Konay Hill, which may be seen from near the Oyster Rocks, and steered for about E.S.E., till in 5 fathoms water; then anchor.

DIRECTIONS for making the port of Beitkul or Carwar in Sedashigur Bay. In the S.W. monsoon, sailing vessels, whether from Europe, China, or the Bay of Bengal, bound to Sedashigur, must pass to the W. of the Maldivh and Lakadivh Islands. When in the latitude of Mount Dolly they may edge away to the N.N.E., and endeavour to make Cape Ramas, a fine bluff, high cape, 17 m. N.W. of Sedashigur, having deep water and no dangers off it; 10 fathoms water with muddy bottom will be found $1\frac{1}{2}$ m. off it; 20 fathoms, mud, at 9 m.; 30 fathoms, mud, at 16 m.; and the edge of the bank of soundings at 45 m. It is recommended to make the land so much to the N. of the port, on account of the strong current, which at this season of the year sets to the S. along this coast. It will also be prudent so to regulate a vessel's speed that she may sight the coast in the day time, when no difficulty will be experienced in making out the headlands and islands.

Cape Ramas is a prominent point of table-land, 200 ft. above the sea, and therefore never visible more than 15 m.; but it projects 1 m. W. of a high bluff, called False Cape Ramas, which may be distinguished in clear weather, by a vessel approaching from the S., at a distance of 25 m. Although this false bluff of Ramas is visible more than 25 m. in clear weather, yet in the thick weather of the S.W. monsoon perhaps not more than one-third of that distance; and, during the heavy rain-squalls, probably no part of this coast can be seen more than 4 or 5 m. Between Cape Ramas and Sedashigur Bay the coast is undulating, forming several small bays; the soundings are regular into 5 fathoms, but the sunken rock, standing out in $5\frac{1}{2}$ fathoms off Loliem Point, must be remembered, as well as the shoal lying $2\frac{1}{2}$ m. to the N.W. of the light-house on the Oyster Rocks.

Running in for Beitkul Cove, during the S.W. monsoon, it will be better to pass round the W. and S. sides of the Oyster Rocks, as in passing to the N.E. of them, under shortened sail, a vessel would (with a flood-tide) drop so much to leeward in the heavy S.W. swell. It is believed, however, that *now* proper lights, beacons, and pilots are available in the S.W. monsoon. During that season the strong current setting down the coast, running at right angles to the swell and wind, is pressed into the bay and runs out along the N. side of Carwar Head. During the N.E. monsoon the port can be approached from any quarter, and with a chart of the bay a vessel can work, or run in, according to the wind. When running into Port Carwar from the S., the summit of Madhully Hill must be *hidden* behind the summit of Curmaghur.

Soundings. Anjedeva and the Oyster Rocks are steep-to on their sea face, and 10 fathoms water is found about $1\frac{1}{2}$ m. from them, and 20 fathoms at 9 or 10 m. Thirty fathoms water is found off this part of the coast at the distance of 18 m. which is much nearer than such a depth is found off Honore and Mangalore, between which places the bank having that depth extends more than 30 m. off shore.

ANJE-DIVA, or ANJADEEPA, in lat. $14^{\circ} 45\frac{1}{2}' N.$, distant 1 m. from the shore to the S. of Carwar Head, is about a mile in length, and possessed by the Portuguese; it appears on the outside barren and rocky; but of a pleasant aspect on the opposite side next the main, where it is fortified by a wall and some towers. In case of necessity, a ship may find shelter under this island from the S.W. monsoon, there being 4 and 5 fathoms in the channel between it and the main land, and no danger but what is visible. Close to it on the outside, the depths are 9 and 10 fathoms, and 14 fathoms about 4 m. distant. To the E. of it, near the shore, is the rocky islet Seria-ka-

Manda (40 ft. high), and the sandy bay abreast of it is called **Binghi Bay**, or Benigee, where wood and water may be procured; for supplies of which the Arab baghalahs (trading in the fine season between the Malabar coast and the Persian Gulf), often resort to this place. There is another rocky islet, called Button Rock, about $2\frac{1}{2}$ m. to the S.E., distant nearly $1\frac{1}{2}$ m. from the shore. The channels amongst these islands are perfectly safe. There is a succession of rocky capes and sandy bays between Carwar Head and Belikeri Bay.

BELIKERI BAY. This is an extensive bay comprehending the whole space between Gungaweli Rocky Cape and Gawda Guda, a distance of nearly 7 m. **Unkola Creek**, distant $2\frac{1}{2}$ m. N. by E. of the N.W. cape of Cusuldeva, is quite dry in the entrance at L. W.; the town of Ankola, or Unkola, which is nearly 2 m. inland, is a large place, having a ruinous fort, a bazar, and many temples. Belikeri Point is a low, flat rocky point 2 m. N. of Unkola Creek; on it is a large bungalow amongst trees, and to the N. of the rocky cape (which projects to the W. with rocks off it), is the little river of Belikeri. At 1 m. to the W. of this river entrance is Kukra, a woody island, almost connected with rocks to Belikeri Point. To the N. of Belikeri Bay there is very high undulating land, about 1,700 ft. above the sea; the low valley of the Belikeri River goes straight to the N.E. for many miles, and shows in striking contrast to the high lands on either side of it. Tulsi Parwat, is a peaked hill, with a black cap, 1,680 ft. high, 4 m. N.E. of Unkola.

Cawda Guda, at the distance of 3 m. W. by N. from Belikeri Point, is a steep rocky cape, projecting into the water to the S.E., and thus forming the extensive Belikeri Bay, which is 2 m. deep, affording excellent shelter from N.W. and even from W. winds, but to small vessels only, as the water is shallow. The bay to the E. of Cawda Guda (not Cawda Bay), is very convenient for grounding small vessels to clean their copper, the water being so smooth in the fine season.

GUNGAWELI RIVER is 5 or 6 m. to the S. of Belikeri, and the same distance to N.N.W. of Tudri S.W. Point; its entrance, which is shallow, and rendered tortuous by sand-banks, is on the sandy shore; but there is a rocky cape close to it, $\frac{1}{2}$ m. to the W.N.W., the cliffs of which extend along the shore for 2 m. to N.W., there terminating in Cusuldeva Guda projecting cape, forming a little bay on its N. side, in which however there is no shelter, as a reef of rocks lies in the middle of it.

Timber depot. From the forests, on the banks of Gungaweli River, splendid teak timber is floated down; this is the property of the British Government, and is carried in native vessels to the dock-yard of Bombay. The rocky cape N.W. of Gungaweli Mouth, called Cusuldeva Guda, is highest in the centre, being there 550 ft., and slopes gradually either way; about 15 m. due E. of it there is a high range of hills, which need not be described, as all the land-marks along this seashore are so prominent and well defined.

TUDRI, or MIRJAN RIVER, (Tudri being the town at its entrance, and Mirjan another about 5 m. higher up) in a fine river, the bar of which bears N.N.W. 6 m. from Cumta Light-house. It is situated in a deep bay formed on the S. side of a high cape, the central part of which, called Kudiniguda, is 430 ft. above the sea. This projecting land affords excellent shelter from N.W. winds to vessels anchoring off the mouth of the river. On the E. side of the entrance is the old hill-fort of Rajahmundry, the upper walls of which are 300 ft. above the sea; and on the top of the hill, about $\frac{1}{2}$ m. to N.E. of the fort, there is a little beacon at 400 ft. above the sea.

Tudri S.W. Point, in lat. $14^{\circ} 31' N.$, lon. $74^{\circ} 18' E.$, stands about 2 m. to W. by N. of the river mouth, and it is 5 m. to S.S.E. of Gungaweli River. Just within the Tudri entrance on the sandy point there is a large screw-house, erected by Mr. Brice, and (abreast it) a wooden pier, where several cotton ships have been loaded since 1857. The town of Tudri lies along the river-bank N.W. of the screw-house. The river is not navigable any distance up, except for small boats, which may go to Cutgal 12 m. above Tudri. On the N.W. extreme of Tudri high land, and close to the sandy shore, lies the famous town of **Gokurn**, (which means the cow's ear,) with many large temples, and tanks of fresh water; this is a place of great repute among the Brahmins.

Anchorage. Large vessels may anchor off the bar in 5 fathoms, mud, with the beacon on Rajahmundry Hill E.N.E., and the outer cape of Tudri N.W.; from this position the Cumta Light will bear S.E. $\frac{1}{2}$ S., and the Tudri River entrance N.E. by E. Arrangements for getting into the river may be made with the local authorities.

Tides. It is H. W. at the bar of Tudri, on F. and C., at 10 h.; ordinary springs rise $6\frac{1}{2}$ ft., extraordinary springs with the night tide in the fine season rise nearly 8 ft.; neaps 4 ft. There is a depth of 10 ft. on the bar at ordinary L. W. springs, and vessels drawing 15 ft. water could be taken in or out at spring-tides.

CUMTA POINT. This little point, bearing S.S.E. 6 m. from Tudri River, and N. by W. $6\frac{1}{2}$ m. from Fortified Island, forms a little bay off the mouth of Cumta Creek which it protects from N.W. winds; but the water is very shallow, and the coasting craft which are too large to enter the

creek at H. W., anchor in 3 or 3½ fathoms, sand and mud, to the S. of the point without any shelter. The commercial town of **Cumta**, or **Coompta**, is on the N. side of the creek, about 1 m. E. of the light-house. Cumta, though an open roadstead, is a place of large trade, owing to roads having been constructed from it to the famous cotton districts of the Dharwar country. About a mile N.W. of Cumta Rocky Cape, is a rock above water, called the Snail Rock, from its resemblance when viewed from the anchorage off Tudri River.

Light. The Cumta Light-house, in lat. 14° 25' N., lon. 74° 23' E., and 6 m. to the N. of Fortified Island, is a white column, 65 ft. high, standing on a hill more than 100 ft. high, situated ½ m. to the E. of the rocky cliffs of Cumta Point. It exhibits, at an elevation of 180 ft. above the sea, a *fixed* White light, visible 12 m. in clear weather. This light overlooks the mouth of the creek which leads boats at H. W. up to the cotton warehouse on the S. side of the town.

Baswarajah Drug, or Fortified Island, in lat. 14° 18½' N., lon. 74° 24' E., has, as its name implies, some old fortifications on it, formerly erected by a Rajah of Mysore, but now in ruins. This Island, which is covered with brush-wood, and standing ½ m. from the shore, bears 3 m. N.W. by N. of Honore River entrance, and consists principally of iron-stone; small coasters find shelter under its lee from N.-Westers.

HONORE, HONAWA, or ONORE, a place of considerable trade in pepper, rice, &c., is situated near the entrance of a salt-water river, between Tudri and Hog Island, and 17 m. N.N.E. from Pigeon Island. The entrance of the river may be easily known by a level island, with fortifications on it, generally called Fortified Island, which is in lat. 14° 19' N., near the shore, about 2 m. to the N. of the river. A ship may anchor in the road, with the flag-staff of Honore bearing E. by N. or E.N.E., Fortified Island N. ½ W., and Pigeon Island about S. by W., distant from the shore 1½ m., in 5 to 6 fathoms, soft ground. Fresh water is here very scarce. There is a large gaol with an hospital at Honore. The English officials are an Assistant Collector and a Judge.

The Coast between Honore and Hog Island is high, and may be approached with safety to 8 fathoms water; but to the S. of that island, between it and Barsalore Peak, the coast ought not to be borrowed on under 12 fathoms in the night, nor under 10 fathoms in the day; for several straggling rocks, under and above water, lie 3 m. from the shore, having 8½ and 9 fathoms within ½ m. of them. Between Hog Island and the main there is a low rugged island, and several rocky islets lie near the shore to the S.

PIGEON ISLAND, or Netrum, in lat. 14° 1' N., lon. 74° 19' E., bears from Anje-Diva about S.S.E., distant 15½ leagues, and nearly S. from the entrance of Tudri River, distant 9½ leagues. It is of good size, about ½ m. across, covered with trees, and 300 ft. high, situated more than 10 m. from the continent, and may be discerned 8 leagues in clear weather; a small rock lies very near it, to the S. There are 20 and 21 fathoms water within a mile of Island bearing E.N.E.; ships passing outside of it in the night ought therefore not to come under 23 or 24 fathoms, which will be within 2 or 3 m. of it: about 3 or 4 leagues from it, the depths are from 30 to 32 fathoms.

HOG ISLAND, or Jali-kund, in lat. 14° 0' N., lon. 74° 28' E., is nearly 300 ft. high, of pyramidal form, and situated very near the main, directly E. from Pigeon Island, distant 9 m. The channel between these islands is safe, with 15 and 16 fathoms water near Pigeon Island, and 8 or 9 fathoms towards Hog Island and the main land, which is rocky, with found ground within the meridian of the island.

From Hog Island to Barsalore Point, the coast extending about S.S.E. ½ E. 6 or 7 leagues, forms some small bays; near the sea the land is generally low and woody, but very high in the country. False Barsalore Peak, 4,400 ft. high, in lat. 13° 51' N., lon. 74° 51' E., is a round mountain, nearly 5 leagues inland; which is frequently set by navigators as Barsalore Peak. W.N.W. 8 m. from the False Peak, and 3 leagues inland, is Barsalore Peak; it stands in lat. 13° 55' N., lon. 74° 44' E., and is 3,600 ft. high. The coast abreast of the Peak, and to the S., is very foul and rocky for nearly 3 leagues to lat. 13° 47' N., for a league off shore. In clear weather this part of the coast is discernible at a great distance.

BATKUL DRUG is a little fort on a rocky point, at the entrance of a little river, and at 4 m. to S.E. of Hog Island. The town is 1 m. up the river, and was formerly a place of considerable trade. The E. I. C. had a factory there, known as **Baticoolo**, which was deserted in 1670, owing to the massacre of the English living there. Some of the inhabitants of this place are descendants of the Arabs, and still retain many customs like to theirs. None but coasters frequent this place now, but a vessel may anchor in 6 fathoms, mud, with Batkul Fort N.E., the immediate vicinity of this anchorage being free from rocks, though many exist to N.W. and S.

Batkul, in lat. 13° 58' N., lon. 74° 32' E., is now the S.-most port under the Bombay Government; the coast from Carwar to Batkul was transferred to Madras.

SEROOR, or **Sherur**, in lat. $13^{\circ} 56' N.$, lon. $74^{\circ} 35' E.$, though an insignificant place now (its ruins point it out as a large town centuries ago), is the N.-most port under the Madras Government; it is 3 or 4 m. to S.E. of Batkul, and a little way to the E. of Huddi Point. **Huddi Point** is $5\frac{1}{2}$ m. N.W. by N. of Byndur Head; the space between them is studded with dangerous rocks; **one white rock**, just above water, bears S.W. by S. $2\frac{1}{2}$ m. from Huddi Point, and 2 m. S. of this single rock are **two white rocks** close together above water; and between these and Byndur Head and S. of that headland there are numerous others, which, extending out to the depth of 7 fathoms water, make this coast unsafe to approach under 10 fathoms. **Byndur River** and town are on the E. side of Byndur Head, which is a piece of table-land jutting into the sea, and running back for some distance inland. The River is only fit for little boats, and the scattered rocks off it make it unsafe to approach.

The Coast. From the Cundapur Sandy Point, which is 3 m. N.W. by N. of that river mouth, and was formerly called Barsalore Point, the sandy coast runs N. by W. $\frac{1}{2}$ W. 12 m. to Byndur Head; at 5 m. S. of which there are some dangerous rocks awash, in 6 and 7 fathoms at L. W., situated 3 m. from the shore. To the W. and N.W. of Byndur are other rocks in even deeper water, which render this part of the coast dangerous, and it is prudent to give them a wide berth. The land near this part of the coast shows in detached pieces of table-land, most easily recognised as such in the morning, when the mist hangs in the valleys; scattered here and there are little round hills of about equal height.

The mountains of Bednore or Nuggur come very close to the sea about here, being only 6 m. off, and have some beautiful peaks more than 3,000 ft. high; **Yelgetty Guda**, the S. one, 2,950 ft. above the sea, is a beautiful sharp peak, at 7 m. to E. of Byndur Head, and very conspicuous to a vessel coming from the N. **Barsalore Peak** is a round mountain, 3,600 ft. above, and 9 m. from the sea; but, having the high chain of the Bednore Mountains for its base, does not show much above them, except at a distance from land. **Colur Guda**, or **Codachi Parwut**, 4,400 ft. above the level of the sea, is a magnificent sugar-loaf peak, 17 m. N.E. $\frac{1}{2}$ N. of Cundapur; it was styled by early navigators *false Barsalore Peak*, from the fact of its being frequently mistaken for the peak of that name, which is 8 m. farther to the W.N.W., and only visible at a great distance from land; for other peaks, intervening between it and the sea, hide Barsalore Peak, whereas Colur Guda is distinct, being perfectly isolated, but it disappears behind the others when bearing to the S. of E.

From Mangalore to Cundapur the whole coast is sandy, with cocoa-nut trees, with the exception of Surutkul little rocky point, and the Cahp battery rocks; at the back of the trees the hills rise gradually towards the base of the mountains.

CUNDAPUR, or **COONDAPOOR RIVER**, in lat. $13^{\circ} 38' N.$, lon. $74^{\circ} 39' E.$, lies to the S.S.E. of Barsalore Point, and is 18 m. N. of Deria Bahadur Ghur. It is now a place of considerable trade; a reef of rocks, on which the sea breaks, lies at 2 m. to the W. of the river entrance; the rocks off it afford a little shelter to small coasters from N.-Westers, but these vessels generally run into the river at H. W. At the distance of 2 m. N.N.W. of the entrance, is a little rocky point; and 1 m. further N.W. is a sandy cape (formerly called Barsalore Point), off both of which patches of rocks extend into 5 fathoms water. This river is only navigable by boats and small vessels; and the shore here should not be approached under 9 fathoms in a large ship.

Barcoor, or **Barkur**, called also **Hungarcutti**, is a little river port, about mid-way between Cundapur and Deria Bahadur Ghur.

THE ST. MARY ISLES extend from lat. $13^{\circ} 27'$ to $13^{\circ} 20' N.$; the outermost of the range being $2\frac{1}{2}$ m. distant from the shore, with a channel with 2 and 3 fathoms irregular soundings between them and the main, but safe only for boats. Some of them may be seen 3 or $3\frac{1}{2}$ leagues from the deck; the others are low, nearly even with the water's edge. They are in one with Barsalore Peak bearing N. by E. $\frac{1}{2}$ E., and some of them are long, flat islets, particularly the S.-most.

Deria Bahadur Ghur, in lat. $13^{\circ} 20' N.$, lon. $74^{\circ} 41' E.$, about 18 m. to the S. by E. of Cundapur, and bearing N. by E. $8\frac{1}{2}$ m. from Molky Rocks, is the highest and middle one of the three islands generally called **St. Mary's Isles**, and its highest part is 70 ft. above the sea; these islands are basaltic, and in some parts have long grass and creepers. The N., a separate island, which is nearly 3 m. N.N.W. of Deria Bahadur Ghur, has cocoa-nut trees on it, and water is obtainable by digging; there are rocks mid-way between these islands, and scattered about to the N. of them; rocks awash extend 1 m. to W. of the cocoa-nut island, and another patch at the distance of 2 m. N.W. of it; whilst to the N. there are other rocks until abreast of Barkur River.

A ship should not approach this part under 8 fathoms by day, in working up the coast, or 12 fathoms by night; in running down coast it is prudent not to come under 15 fathoms.

Anchorage. To small coasting vessels excellent shelter is afforded from N.W. winds between Deria Bahadur Ghur and the sandy shore abreast; the passage in is close round the S. end of

these three islands, and the anchorage is in 8 fathoms at L. W., sand and mud bottom, with the highest part of Deria bearing N.W. The sandy shore abreast of these isles is the point of **Mulpy**, or Moolapi River, inside of which stands the little port of **Oodiawar**, not far from the town of **Oodapee**, one of the German missionary stations, so numerous along this coast, and doing such good work in the improvement of the natives.

The **MULKY**, or **PRIMEIRA ROCKS**, in lat. $13^{\circ} 12' N.$, lon. $74^{\circ} 40' E.$ (nearly 3 leagues to the S. of Deria Bahadur Ghur), bear from Mangalore Light-house N.N.W. $\frac{1}{4}$ W. 22 m.; they are situated 4 m. from the main land, are of black basalt, elevated in parts 40 ft. above the sea, and may be seen 9 or 10 m. from a ship's deck. On their E. side the bottom is sand and broken shells, which is not good holding-ground, otherwise a vessel in extremity might anchor to leeward of them in a W. gale. The channel between them and the main is perfectly safe, but contracted to a breadth of 2 m. on the N. by the Cahp Rocks, which are above and below water, 3 m. to the N.E. of the Primeira; and there is a detached rock out in 4 fathoms 3 m. due E. of them, off the little hill of **Uchil Guda**, which hill is on the shore 20 m. N. by W. $\frac{1}{4}$ W. from Mangalore Light-house. **Cahp Battery**, 2 m. N. by W. of Uchil, is an old rock fortification on the sandy shore, and from this the outermost Cahp Rocks bear W. by N. $1\frac{1}{4}$ m. There is an old temple, called **Cunjar Guda**, within a fort on an isolated hill, 280 ft. high, a good land-mark, 4 m. N.E. of Cahp Battery.

Rocks awash. At the distance of 4 m. N. by E. from the Molky Rocks, is a patch of dangerous rocks awash; they lie out in 5 fathoms, with **Cunjar Guda** bearing E., and they are $1\frac{1}{4}$ m. to the S.W. of a solitary black rock standing out of the water, mid-way between Cahp Rocks and the S. islet of the Deria Bahadur Ghur group.

MANGALORE, or **Kodyal Bunder**, in lat. $12^{\circ} 52' N.$, lon. $74^{\circ} 49\frac{1}{4}' E.$, is the chief town in the province of Canara, and a place of large trade; the light-house is on high ground, $1\frac{1}{4}$ m. E.N.E. of the river entrance, and 250 ft. above the sea. The town is very large, and on the N. and E. sides of the river, which is navigable for boats for many miles up to **Buntwal**, a large town. The bar has only 6 or 7 ft. on it at low spring tides, so that only small vessels can enter; Arab vessels of 150 tons manage to get in at high springs, but the larger baghalas, which bring horses from the Persian Gulf, are compelled to lie out in the roadstead. The houses and trees on the elevated plateau by Mangalore Light-house unmistakeably point it out; **Barn Hill**, 16 m. to S.E. of it, is also a good mark. The **Ass's Ears**, or **Codinjau Col**, 17 m. N.E. of Mangalore, is a rugged, double-peaked hill, of limestone, 1,100 ft. above the sea, rising almost vertically from the low country, but is in many views only just visible from sea-ward above the tops of intervening flat hills. **Mount Hyder**, or **Kudri Mukh** (the horse's face), 30 m. N.E. by E. of Mangalore, is a magnificent peak, 6,000 ft. above the sea, abruptly terminating on the S., when viewed from the W. It is the S.W. extreme of the Nuggur, or **Bednore** district, of the independent principality of Mysore, and beyond it the Ghauts recede much to the E.; the hills at the back of Mangalore are undulating, and separated from each other by valleys through which rivers run from the mountains.

Light. A fixed light on a white tower is exhibited on the hill at the back of the town, at an elevation of 250 ft., and may be seen in clear weather 14 m., but in the hazy weather of March and April, only 10 or 11 m. On the light-house hill there are houses and trees, which form conspicuous marks in the day time.

Tides. It is H. W. on F. and C., at 11 h.; ordinary springs rise 7 ft., neaps $3\frac{1}{4}$ ft.; night tides are higher than day tides in the fine season.

Anchorage. The most convenient anchorage for communicating with the river, is with the light house E.N.E. in 5 or 6 fathoms, muddy bottom; in case of a N.-Wester (which breezes prevail here in the afternoon between Feb. and May), boats can conveniently come at H. W. out of the **Gurpur Mouth**, 2 m. N. of the Mangalore entrance.

Approaching Mangalore from the N., caution is necessary to avoid the **St. Mary's Isles** and **Molky Rocks**, the latter being in the line of 9 fathoms, and it must be remembered that this is a projecting part of the coast. The bank on which a ship may get soundings extends nearly 40 m. off Mangalore; there being a depth of 10 fathoms at 4 m. off shore, 20 fathoms at 10 m., and 30 fathoms at 18 m., all muddy bottom, between Mangalore and **Mount Delly**; but above the latitude of Mangalore these depths are found much further off shore. Abreast of **Barkur** and **Cundapur**, 30 fathoms, is found more than 30 m. from land, and soundings of between 20 and 30 fathoms occupy a flat, 17 m. broad E. and W., between the latitudes of **St. Mary's Isles** and **Pigeon Island**. At depths greater than 30 fathoms on this part of the coast the bottom is generally sand or rock. **Surutkul** is a little point with a temple on it, about 150 ft. above the sea, bearing N. by W. 9 m. from Mangalore River mouth; the intermediate shore is straight, sandy, and planted with cocoa-nut trees. **Molky River entrance** is 4 m. to N. of **Surutkul**, on the same bearing, and is nearly 10 m. to S.E. of the Primeira, or **Molky Rocks**.

The Coast. From Mangalore, the direction of the coast is S.S.E. 18 leagues to Mount Delly; the land near the sea is generally low and woody, particularly to the S. of Barn Hill, or Pussodi Gumpa, which is a sloping mount, nearly level on the summit, 1,000 ft. high, situated a little inland, in lat. $12^{\circ} 40\frac{1}{2}'$ N., lon. $75^{\circ} 0'$ E., and $5\frac{1}{2}$ leagues distant on a S.E. bearing from Mangalore. About 7 leagues to the S. of this hill, and nearly an equal distance from Mount Delly, stands another mount, in lat. $12^{\circ} 23'$ N., 500 ft. high, 3 m. inland, called Mount Formosa, and there are other hills farther from the sea, and 2,800 ft. above level of the sea. In passing along this part of the coast there is no danger, the depths decreasing regularly towards the shore to 7 or 8 fathoms about 3 m. off. A ship in working may stand in to 7 or 8 fathoms, soft ground, when the weather is fine. Between Mangalore and Beykul, there are three considerable streams, Manjeshwur, Cumla, and Causergode, all reckoned among the minor ports of Madras. The bars of these rivers change every year, and a native pilot is a necessity.

BEYKUL FORT, in lat. $12^{\circ} 23'$ N., lon. $75^{\circ} 1'$ E., covering the whole extent of a little prominent point, 180 ft. high, bears from Delly little cape N.N.W. 25 m.; there is a traveller's bungalow among trees to the N. of the Fort. Rather more than $1\frac{1}{4}$ m. to N.W. of this Fort is a reef of rocks, on which the sea breaks, having 4 fathoms close to it; this reef is rather more than $\frac{1}{2}$ m. to the S.W. of another little rocky cape. The coast from Beykul to Mangalore is all sand, fringed with cocoa-nut trees, with the exception of the little rocky points before mentioned; the land at the back rises gradually from the sea, until at 5 m. distance there is table-land nearly 400 ft. high, intersected by rivers every 6 or 7 m. To E. of Beykul and Hoss Droog, a spur of the Ghauts, of considerable elevation, reaches toward the coast, but to the N. of this the high land recedes, and is not often visible.

CAVOY, or KUYOY RIVER, in lat. $12^{\circ} 5'$ N., about 20 m. to S.S.E. of Beykul, is a river which skirts round the N. side of Delly high land, and is the actual boundary of the provinces of Malabar and Canara; its mouth is 4 m. N.N.W. from Delly Fort Point; it runs parallel with the coast for 15 m. N., but is only available for small boats. The ancient city Nileshtar was up this river. **The Coast** N. of Kuvoy is a very straight sandy shore for 20 m.; at a distance of 5 m. from the sea there is table-land, from 150 to 250 ft. high. Nearly 20 m. N. by W. $\frac{1}{4}$ W. from Delly Cape is the old fort of Hoss Droog, on elevated ground, and close to it a traveller's bungalow, rather more than a mile from the shore, and about 150 ft. above the sea; 2 or 3 m. at the back of this is a wooded hill, 550 ft. above the sea, which early navigators called Mount Formosa; it is the outermost detached hill of a spur which stretches W. from the mountains of Coorg. Eastward of this hill are other conspicuous peaks, increasing in elevation as they near the Ghauts, which in Coorg are 4,000 or 5,000 ft. high, but seldom are visible from the sea, except in very clear weather.

COAST OF MALABAR.

This coast commences at Kuvoy or Cavo, and Calicut is its chief town. The S. extreme of the British province of Malabar is just above Cranganore. It seems necessary to explain this; for navigators, being in the habit of calling the whole sea-board the Malabar Coast, from Bombay to Cape Comorin, are liable to be misunderstood by the natives and residents in India. The Malabar Coast in its S. portion, from Paliport to Beypore, is wholly devoid of conspicuous land-marks, being low and sandy, with cocoa-nut trees: Beypore, the terminus of the Madras railway, has some little hills at its back, and above it to Mount Delly the coast is bolder, being composed of sandy bays, interrupted here and there by slightly-elevated rocky points. Mount Delly is a remarkable headland, whose summit is 850 ft. above the sea, in reality an island, though separated by only a narrow creek from the low and sandy ground which fills up the intervals between the headland and the laterite table-land of Pyangadi, which latter is less than 100 ft. in elevation at a distance of 2 m. from the Mount, and gently rises towards the Ghauts, but does not attain to the same elevation as Delly till a dozen miles from it.

The Kundah range of Ghauts approach the sea between Tellicherry and Calicut, and are higher here than on any other part of the W. coast. The highest and most remarkable, called the Camel's Hump, about 7,000 ft. above the sea-level, stands in a N.E. direction more than 20 m. from Calicut. The Wynad range, at the back of Tellicherry, has several very conspicuous and beautiful peaks, the most W. standing prominently forward only 10 m. to the E. of that sea-port; to the N. of them the high-land recedes from the coast, and the valley of the Billipitam River fills the space to the mountains of Coorg, which, though of great elevation, are situated far from the sea, and only visible in very clear weather.

MOUNT DILLY, or DELLI, may, however, be considered the limit between the coasts of Canara and Malabar, which is a conspicuous headland (the summit 850 ft.) that may be seen 8 or 9

leagues from the deck, in clear weather. The contiguous coast, being low and woody, is not seen far, which gives the Mount the appearance of a high island, when viewed either from the N. or S. The outer extreme of this headland terminates in the S.W. bluff point, having on it a small ancient fort, of black aspect, situated in lat. $12^{\circ} 04' N.$, lon. $75^{\circ} 11\frac{1}{2}' E.$ The shore here is bold and safe to approach, there being 7 and 8 fathoms at 2 m. distance; 20 and 22 fathoms at 2 or $2\frac{1}{2}$ leagues' distance; and at 15 leagues' distance, abreast the Mount, you lose soundings. This is the narrowest part of the channel between the main and Laccadiva Islands, the distance being 28 leagues betwixt Elicalpeni Bank and Mount Delly. Abreast of this headland there is frequently a drain of current to the S., and a short confused swell, the effect of brisk N.W. winds, which greatly prevail here. The kingdom of Eli is mentioned (as existing hereabouts) by Marco Polo, who said that great Chinese vessels used to come to this bay before the twelfth century. The Portuguese gave to the hill the name of *Monte d'Eli*, from which comes the present name.

Bilipatam, or Balliapatam River, is 6 m. to the S.E. of Mount Delly; the coast between them, forming a bight, is low, covered with trees, safe to approach to 5 or 6 fathoms, in regular soundings, soft ground. This river extends a considerable way inland, and is a place of some trade, although navigable only by boats or small vessels, there being from 1 to 2 fathoms water at the entrance, abreast of which ships may anchor in $3\frac{1}{2}$, 4, or 5 fathoms, from 1 to 2 m. off shore.

CANNANORE FORT flag-staff, in lat. $11^{\circ} 51' N.$, lon. $75^{\circ} 22' E.$, bears from Monte d'Eli Fort S.E. $\frac{1}{2}$ E. 14 m., and is about 9 m. to the N.W. of Tellicherry. The point is 2 cables' lengths W.S.W. of the flag-staff, and has a reddish appearance. To the W. of the fort are the British barracks, between which and the sea are three or four cocoa-nut trees overhanging the sea; to N. of these are several houses amongst trees, on slightly-elevated red cliffs, about 40 or 50 ft. above the sea. To the N.N.E. of the flag-staff is the English church, on elevated ground, and other houses and trees beyond. Nearly 9 m. N. of the Fort is the Collector's cutcherry, a thatched building, on elevated ground, 250 ft. above the sea. The houses of Cannanore cantonment extend along the cliffs some distance N. of the Fort, and $4\frac{1}{2}$ m. N.W. of it there is a projecting rocky point of elevated red land, with high cocoa-nut trees; and 3 m. farther N.W. is the mouth of the Billiapatam River, down which excellent poon spars for ships' masts are brought. Between the above red point and the base of Mount Delly the sea shore is low, sandy, and fringed with cocoa-nut trees; 3 or 4 m. inland the country becomes hilly. There is backwater communication for boats from this river to Hoss Droog, nearly 30 m. to the N., passing to the E. of Mount Delly.

Supplies. Good water may be obtained from the wells on the beach to N.E. of the fort; fresh provisions and refreshments of various kinds, and excellent fruit may be procured; there are Government Commissariat and Ordnance Departments at Cannanore: in fact it is a large military station.

Light. A *fixed* White light, elevated 110 ft., and visible 12 m. off, is shown from the flag-staff at Cannanore; it is, however, extinguished during the S.W. monsoon, from May 20th to Aug. 10th.

Anchorage. Vessels may anchor with the flag-staff N.N.E. about $1\frac{1}{2}$ m. off shore, in 5 fathoms, mud. Ships' boats can easily land in the bay to N.E. of the fort; the custom-house is on the sandy beach, more than $\frac{1}{2}$ m. E. of the fort. There are a few sunken rocks off Cannanore Point, but not outside of 4 fathoms. With a S. or a S.W. wind, a heavy swell prevents landing in Cannanore Bay.

TELLICHERRY (the flag-staff), in lat. $11^{\circ} 45' N.$, lon. $75^{\circ} 28\frac{1}{2}' E.$, bears S.E. $\frac{1}{2}$ E. from the fort on Mount Delly, 23 m., and 3 leagues to the S.E. of Cannanore Point; the coast between them is safe to approach to 5 fathoms, but a large ship ought not to come under 7 fathoms in the night, for it is rocky under 4 fathoms from Tellicherry to Green Island, a small island covered with trees, situated close to Durmapatam Point, about 3 m. to the N. of the anchorage, where two small rivers fall into the sea, having 4 or 5 ft. water at the entrance, one of which goes up to Anjerandy. The anchorage in the road is soft mud, in $5\frac{1}{2}$ or $5\frac{3}{4}$ fathoms, with the flag-staff bearing N.E. by N., and Green Island N.N.W. off the town 2 m. Large ships touching here, or at other places on the coast, where there is a chance of unsettled weather, should anchor well out in 7 or 8 fathoms. The fleet having anchored in 5 and $5\frac{1}{2}$ fathoms, a heavy sea began to roll in, which made the *Superb* strike on the *Sultan's* anchor, she being moored inside. The land about Tellicherry and Cannanore appears rather low and barren near the sea, but at a distance in the country, over the former place, the Ghauts are formed of high undulating mountains. From Mount Delly to Tellicherry the soundings are regular, 20 or 22 fathoms about 4 leagues off, and 30 to 34 fathoms 7 or 8 leagues off.

Tellicherry Flag-staff in the fort is 9 m. to S.E. of Cannanore, and bears N.W. nearly 4 m. from Mahe flag-staff. The fort, in which are situated the gao and hospital, is built on rising ground, 100 yards from the sea, and about 40 ft. above its level. At $\frac{1}{2}$ m. to S.W. of the flag-staff is a ridge of basalt rocks, lying parallel with the coast for 2 cables' lengths; between them and the shore

are detached rocks, above and below water, but they only afford shelter to the landing-place at low tide, during N.W. winds. Within and on the N. side of the ledge of rocks fronting the fort, small vessels have been known to be moored head and stern during the S.W. monsoon. **Green Island**, at $2\frac{1}{4}$ m. N.W. by W. of Tellicherry flag-staff, and 2 or 3 cables' lengths from Durmapatam Point, is surrounded by rocks, and they are scattered over the whole space between this Island and the Tellicherry Rocks. Durmapatam old fort is 1 m. within the Point, and about 200 ft. above the sea. Boats sometimes bring their cargo to ships out of the little river E. of Durmapatam.

Trade. A considerable and increasing trade in coffee now goes on at Tellicherry; other articles of commerce are pepper, cardamoms, ginger, arrowroot, cinnamon, rice, and sandal-wood; good water and other refreshments on a small scale may be procured here; small native boats bring much coir yarn to this place and Cannanore from the Lakadivh Islands, taking away rice in exchange. There is a custom-house at Tellicherry, and a Government medical officer; several English merchants are also settled there. The population is about 20,000, the majority of whom are Moplahs, or Muselmin; the rest Brahmins and Tiars, with a few Roman Catholics.

Lights. Two vertical *fixed* White lights, elevated respectively 140 and 104 ft. above the sea level, are shown all night throughout the year from the flag-staff at Tellicherry. In clear weather they are visible 12 m. The high light, in the S.W. monsoon, is lowered to 112 ft.

Anchorage. Large ships must anchor well out in 6 or 7 fathoms, when there is a chance of unsettled weather; but in the fine season, when *only* trade is carried on along this coast, vessels may anchor in 5 fathoms, soft mud, with the flag-staff N.E. and Green Island N.N.W., rather more than 1 m. from the rocks.

Tides. It is H. W. on F. and C., at 11 h. 40 m., springs rise 5 ft., but extraordinary tides 6 ft.; neaps rise 3 ft.

MAHE FORT flag-staff, in lat. $11^{\circ} 42' N.$, lon. $75^{\circ} 31' E.$, stands 4 m. to S.E. of Tellicherry, and bears N.N.W. 15 m. from Ticottay Point, and N. $12\frac{1}{4}$ m. of the Sacrifice Rock. This is a French settlement, of but small extent, at the mouth of a little river, off which are sunken rocks: ships' boats should not attempt to run in till they have examined the passage, which is very narrow. The land at the back of Mahe and Tellicherry consists of detached hills, on which are old forts and houses. Vessels may anchor off Mahe in 5 fathoms, mud, with the flag-staff E.N.E., and 2 m. from shore.

Wuddakurray, or Badagherry, is a town of importance, about mid-way between Mahe and Ticottay Point. At the back of the town, and on to Cannanore, there are pretty undulating hills, about 400 ft. high; and the Wynaad range of mountains to the E. have remarkable and lofty peaks, which make this the most beautiful part of the Malabar coast.

SACRIFICE ROCK, called also Kanahli, or Cugnali, in lat. $11^{\circ} 29\frac{1}{4}' N.$, lon. $75^{\circ} 31\frac{1}{4}' E.$, bears S. $\frac{1}{2}$ E. from Tellicherry $5\frac{1}{2}$ leagues, and is distant $4\frac{1}{4}$ m. from the land opposite; it has a white aspect, 40 ft. in height, and is discernible 3 and $3\frac{1}{4}$ leagues from a large ship, the deck being elevated 15 or 20 ft. above water; by the natives of Malabar it is called Billiculor, or the White Rock. This rock or island is steep all round, having 12 and 13 fathoms close to it, 16 fathoms $2\frac{1}{4}$ m. outside, 10 fathoms within it, to 7 fathoms about mid-way between it and the main, in a very good channel.

Ticottay or Cotta Point, situated to the E. of Sacrifice Rock, at the entrance of Cotta River, is low and covered with trees, having a reef of shoal water extending from it along shore to the N., extending about $2\frac{1}{4}$ m. off shore. Ships passing through the inside channel ought, therefore, to give the Point a berth of 3 m., by borrowing towards the rock; and in working should heave the lead quick, if they come under 6 fathoms standing in shore. Passing outside Sacrifice Rock in the night, do not come under 16 or 17 fathoms water. The *Prudence* and *Union*, ordnance store-ships, were driven from Calicut Road in a storm, at the setting in of the S.W. monsoon, and not being able to weather Cotta Point, were both wrecked on the reefs near it. About fourteen years afterwards, the *Hercules*, of Bombay, by borrowing too close in the night, grounded, and was nearly lost.

CALICUT, in lat. $11^{\circ} 15\frac{1}{4}' N.$, lon. $75^{\circ} 45\frac{1}{4}' E.$, bears from Sacrifice Rock S.E., distant 20 m., and N. by W. $\frac{1}{4}$ W. 6 m. from Beypore. Calicut has a light-house, a white stone column 105 ft. high, standing on the sandy beach a few yards N. of the custom-house. It is a prominent mark from sea-ward in the afternoon; but is scarcely distinguishable even with a telescope in the morning. The same may be said of the town, which covers a good extent of the beach, but the houses are much hidden by the cocoa-nut trees. The houses of the English authorities amongst trees on little hills (about 200 ft. high), and $2\frac{1}{4}$ m. N. of the light-house, form the best land-marks for Calicut; and vessels should anchor in 5 fathoms, mud, with those houses bearing N.E., or the light-house E., as it is all foul ground S. of that line even out to 6 fathoms.

Calicut has a large trade in pepper, coffee, cardamoms, rice, coir-rope, timber, &c. The

merchants find it more convenient, when the sea-breezes are strong, to load from the beach abreast of the hill-houses, 1 or 2 m. to N. of the light-house, where there is always less surf than opposite the town. A screw-pile pier has lately been erected to the N. of the light-house. Large kotiyehs and pattamars are built on the beach $1\frac{1}{2}$ m. S. of the light-house, by the entrance of Calicut River or Creek, where the shore is also smooth, being partially protected by the Coots Reef.

Sunken Rock. There is a patch of rocky ground with 4 fathoms least water, having 6 fathoms, mud, all around it, bearing W.N.W. distant $3\frac{1}{2}$ m. from the light-house. This is supposed to be the shoal discovered by Captain Hogg of the *Juliana*.

Calicut Reef, on which the sea breaks in one part almost always where there is only 2 ft. at L. W., is of irregular outline. This shoal-patch of 2 ft. is in its centre, and bears from the light-house S.S.W. $\frac{1}{2}$ W. $1\frac{1}{2}$ m., and is distant 6 cables' lengths from the nearest shore abreast. The S. extreme of this reef (which is generally called the **Coots Reef**, after the late E. I. C. sloop-of-war *Coots*, which was lost there) lies 2 cables' lengths to the S. of the centre breakers. To the S. and E. of the reef the bottom is soft mud; and there is a considerable extent of anchoring ground for small coasting craft in 2 and $2\frac{1}{2}$ fathoms at L. W., partially protected from N.W. winds by the reef. A Black buoy to mark the W. extreme of this reef, and as a guide to small coasting vessels, was moored 2 cables' lengths W. by N. from the shoalest part. Sea-ward of the reef are numerous dangerous rocky patches, but none have less than 2 fathoms on them, and this foul ground extends more than 2 m. off shore. One patch of 13 ft. at L. W. bears S.W. $\frac{1}{2}$ W. $1\frac{1}{2}$ m. from the light-house, and another with a similar depth S.S.W. $\frac{1}{2}$ W. rather more than 2 m.

Light. The light-house exhibits at 110 ft. above the sea a *fixed* White light, visible in clear weather at 12 m., but not lighted in the S.W. monsoon, from May 20th to Aug. 10th.

Tides. It is H. W. on F. and C., at Calicut and Beypore at 12 h. 15 m.; springs rise little more than 4 ft., but extraordinary tides as much as 5 ft.; neaps rise $2\frac{1}{2}$ ft.

Calicut S.W. Shoal bears from the light-house about S.W. by W., $2\frac{1}{2}$ m. On the N. extremity of this shoal, with the light-house bearing E.N.E., are rocks in 4 fathoms, and on its W. edge rocks in $4\frac{1}{2}$ fathoms. Over the centre of the shoals are numerous rocky heads, with 3 fathoms on them, and $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms between them. These are the rocks on which the *Juliana* first struck, when Captain Hogg anchored in 5 fathoms, light-house bearing E.N.E. On the inner or E. side of the shoal was 4 fathoms clear ground, with the water decreasing gradually towards the shore. When there is any sea on, it breaks, and may generally be seen. On the outer edge are rocks in $3\frac{1}{2}$ fathoms with 2 and $2\frac{1}{2}$, and the remains of the *Juliana* lay in $3\frac{1}{2}$ fathoms, S.W. $\frac{1}{2}$ S., about $1\frac{1}{2}$ m. from the light-house. There is said to be another dangerous ledge, bearing W. from the light-house, from $1\frac{1}{2}$ to $2\frac{1}{2}$ m. distant. On the N. side of this shoal, with the light-house E. $\frac{1}{2}$ S., are 4 fathoms, and on the S. side with light-house E. $\frac{1}{2}$ N., 4 fathoms; on the W. extremity $4\frac{1}{2}$ fathoms.

Ships approaching from either the S. or the N., intending to anchor, ought not to come inside of 8 fathoms till the light-house bears E. by S., then steer for the anchorage. The best anchorage in Calicut Roads is, during the N.E. monsoon, in $5\frac{1}{2}$ fathoms, with the light-house about E. by S., which is a convenient berth for the new screw-pile pier.

ASPECT OF COAST. From Ponany to Calicut, and onwards to Cotta Point, the coast is low, sandy, and fringed with cocoa-nut trees, with red laterite hills at the back. About 10 m. inland of Calicut are isolated hills about 800 ft. high. The best distinguishing mark for Calicut in the morning is the house amongst trees on the hill more than 2 m. N. of the light-house; in the afternoon the white column of the light-house shows well 10 m. off. **The Camels Hump**, or Wavut-mullay, about 7,000 ft. above the sea level, (the culminating peak of the Kundah Mountains which stand 20 m. W. of the Nilghiri Range), bears from Calicut Light-house N.E. by E. $\frac{1}{2}$ E. $28\frac{1}{2}$ m. It may be seen in clear weather, as soon as a vessel is on the bank of soundings; but in the hazy weather of March and April it is frequently indistinct from the anchorage off Calicut. The S. extremity of Kundah Range is rather abrupt, the mountains thence receding far to the E.

BEYPORE, or BAIPUR RIVER, in lat. $11^{\circ} 10' N.$, lon. $75^{\circ} 47' E.$, bearing S. by E. from Calicut, about 2 leagues distant, has 8 or 10 ft. on the bar at high tides; but the rise and fall is very little along the Malabar coast. This river takes its rise from the Ghauts, and runs through a country abounding with excellent teak-timber for ship-building. A little inland from this place there is a hill called the Dolphin's Head. About 4 leagues farther to the S., in lat. $10^{\circ} 59' N.$, is situated the small river of Tanore, and $3\frac{1}{2}$ leagues distant from it to the S. by E. is Ponany River. Tanore may be known by a tuft of trees: the coast is very woody between it and Ponany.

Beypore* is now become a place of importance at the terminus of the Madras Railway; but

* At present there is no light-house at Beypore.

being so close to Calicut, and having no dangers near the shore except the rocks which are visible, the light-house of Calicut is made to answer for both places, and there is one Conservator only for the two ports. There is a good landing-place for boats on the E. side of the Chaliom Rocks, which (at L. W. when the sea is rough and the bar of the river unsafe to cross) make a still-water harbour during N.W. winds. Beats should pass round the S. end of these rocks where they rise several feet out of the water and are deep to. At 2 m. up the river, on the N. bank, there is the Beypore Iron-Foundry, an extensive establishment, where castings of a considerable size, and other iron-works are executed. Chaliom is the town on the S. side of Beypore River entrance, where the railway terminus is situated: it is low and woody, but at the back the land rises gradually. Kolahcoon, or two-tree hill, bearing S.E. by E., and distant about 3 m. from the river mouth, is about 200 ft. above the sea. Oorutmulla, the Dolphin's Head, is a wooded hill about 900 ft. above the sea, bearing E. by S. $\frac{1}{2}$ S. distant 13 m. from Beypore: it shows well when seen over Calicut, or bearing S.E.; but when seen at the back of Tanore, or bearing N.E., is not at all a good landmark. Tanore is a town of some size on the sea-shore, about mid-way between Ponany and Beypore.

PONANY, or PANIANI RIVER (the tree near it), is in lat. $10^{\circ} 47' N.$, lon. $75^{\circ} 53' E.$; the river is navigable only by small craft, the water being shoal. The coast from Calicut to this place, and from hence to Cochin, may be approached to 7 fathoms. The whole of this space is low and woody fronting the sea, but inland, the high ridge of mountains called the Ghauts extend nearly parallel to the coast to Cape Comorin, excepting a remarkable interruption, or gap of low land, between Paniani and Cochin, through which the land-winds usually blow stronger than any other part of the coast. Supplies and water are to be procured. H. W. on F. and C. before 1 o'clock, rise and fall 6 ft. There is a timber depot for teak, anjeli, erool, and other woods, on the S. side of this river, at $\frac{1}{2}$ m. within the entrance. The timber is brought and floated down from the Anamullay forests.

CHITWA (the church), in lat. $10^{\circ} 32' N.$, is situated on the N. side of the River Chitwa, or Palur, about 6 leagues S.S.E. of Paniani River. **Chitwa Town, or Chitwe** (at the entrance of a river, now usually called Chowghat, from the principal town, about 3 m. N. of the village of Chitwe), bears from Paliport N.N.W. 22 m. Small coasting vessels only can enter this little river at H. W. The sea-face of this part of the coast is all low and sandy, fringed with cocoa-nut trees, amongst which houses are visible at intervals. At the distance of 15 m. to E. of Chowghat is the base of the mountains; but off that place it is difficult to make out any particular peak. There is a little round red hill about 8 m. N.E. of Chowghat, about 250 ft. high, with a tree on its top. About 18 m. to the E.N.E. of Chowghat is a range of hills intermediate between the Ghauts and the coast; the S.E. extreme is the highest, and more than 1,000 ft. above the sea, and like a porpoise's back, rather abruptly terminating on the S. Ships anchor off this place in 6 fathoms, mud, abreast the river, which is wide; but the water being shallow, it will admit only boats or small vessels.

COCHIN AND TRAVANCORE COASTS.

The Cochin Coast from Paliport to within a few miles of Alipee, is all low and sandy, with cocoa-nut trees, having no elevated land whatever near the sea. The highest Ghauts are nearly 50 m. inland, though several spurs, with remarkable hills, stand between them and the sea, but none near enough to be distinguished, except when the weather is clear. The Anamullay Mountains stand in British territory, on the E. side of the province of Cochin, and to the S. of the Palghat Gap; they furnish good but small teak timber for ship-building, which is brought to the sea-coast at Ponany. The highest peaks of the Anamullay range are upwards of 6,000 ft. above sea-level, but nearly 50 m. inland. **Colungode Bluff**, the N.W. extreme of these mountains, estimated at 5,000 ft. high, is a remarkably steep bluff facing the N. It is about 40 m. E. $\frac{1}{2}$ N. of Chowghat, and makes the S. boundary of the Palghat gap, through which the Ponany river flows, and the Madras Railway now passes, and through which the land-winds blow so fiercely between Nov. and Feb. This remarkable gap, more than 4,000 ft. lower than the hills on its N. and S., is on the meridian of $76^{\circ} 45' E.$, and between the parallels of $10^{\circ} 33' N.$, and $10^{\circ} 52' N.$ In the fine weather of the N.E. monsoon, the Colungode bluff is very conspicuous, but in the hazy weather, after February, it is seldom seen.

The Travancore Coast, from Alipee to Comorin, is generally low and sandy, fringed with cocoa-nut trees, but patches of red cliffs of slight elevation here and there break the otherwise continuous line of sand. The Travancore Mountains, though generally spoken of by navigators as a part of the Western Ghauts, are indeed separated from the latter by a low neck of land, the Palghat

Valley, which has proved a most useful feature in the railway communication between E. and W. coasts. The length of this S. mountain chain, extending from a few miles N. of Cape Comorin to the Valley of Palghat, is nearly 200 m. The W. brow, overlooking the coast of Travancore, is, with little exception, abrupt; on the E. side of the culminating range the declivity is in general gradual, the surface in many places being extensive table-land, sloping gently and nearly imperceptibly to the E.-ward. In the last half of the year many a cascade of great height is visible from sea-ward, pouring down the steep declivity of these W. ghauts, which present so vast and lofty a front to the violence of the S.W. monsoon.

The principal peaks of the Travancore Ghauts are as follows: Miandraghiri, between 3,000 and 4,000 ft. about 20 m. N. of Comorin, and Ouchy Mulla, nearly 5,000 ft., the same distance N.E. of Trivandrum. Between these peaks the culminating range has a N.W. direction, but afterwards trends a little E. of N., more away from the coast; and its highest mountains, though loftier, are not so often visible at sea; they form the boundary between the independent state of Travancore on the W., and the British province of Tinivelly on the E. To the E. of Quilon there are broad, high peaks, estimated at 5,000 ft. above, and more than 30 m. from the sea. The S. portion of the W. Ghauts, from Comorin to Palghat (which run like a spine from S. to N., thus forming the water-parting between the E. and W. coast rivers), being exposed to all winds from E., round by the S. to W., there is scarcely a day when rain-clouds may not be seen hiding for a time the summits of the high land. Towards the vernal equinox (after which the air gets saturated with moisture and is hazy) the Ghauts N. of Quilon up to Calicut can seldom be seen. Midway between the above lofty summits of the Ghauts and the low sea-coast, the country has several hills of moderate elevation, useful as land-marks. Beginning from the S., mention may be made of the isolated conical mount, in lat. $8^{\circ} 8' N.$, and lon. $78^{\circ} 30' E.$, near Cape Comorin, and taken as the cape by seamen when approaching the coast from the W. The next conspicuous peak is Maruvatur, about midway between Miandraghiri and the Crocodile Rock, and 10 m. N.W. of the conical mount. On the S.E. of Trivandrum, and again to the N. of that capital, hills, averaging about 400 ft. lie parallel to the shore, some 4 or 5 m. off. Near Anjengo there are a few low hills, but above that place extensive back-waters become the peculiar feature, overspreading great portions of the low tract of country.

Vessels bound to any port on the W. coast of Hindostan, and to the Persian Gulf during the N.E. monsoon, from China, Australia, and the Bay of Bengal, or from Europe, should sight Ceylon, and make the coast of India somewhere near Cape Comorin, and thence hug the coast to profit by the land and sea-breezes. The coast from Cape Comorin takes a general N.-westerly direction for nearly 300 m. to Mount Dolly. From the village of Comorin to Alippee belongs to the Rajah of Travancore; thence to Paliport (with the exception of the port of Cochin, under the British government) is the territory of the Rajah of Cochin; above Paliport to Mount Dolly is the British province of Malabar.

PALIPORT RIVER. Cranganore, or Kodungalore, in lat. $10^{\circ} 12' N.$, where the Dutch had a fort and factory, lies on the N. side of, and $2\frac{1}{2}$ m. within the mouth of a river called Paliport, the entrance to which bears from Cochin N. by W. $\frac{1}{4}$ W., 14 m. Between these two places is an extensive soft mud bank, which (like that off Alippee) shifts its position, also rendering several portions of this shore free from surf, and consequently safe landing-places. At 5 m. S. of Paliport this **soft mud bank**, having little more than 1 fathom on it, extends nearly 3 m. to sea-ward of the cocoa-nut trees. The river has a bar, and is only available for small coasting craft. The times of H. W., and the rise of tide, are almost the same as at Cochin, but more regular; and the rise and fall is a little greater. Coir, timber, and some pepper, are exported from these rivers situated between Calicut and Cochin. From Cranganore the coast stretches S. by E. $\frac{1}{4}$ E., $4\frac{1}{4}$ leagues to Cochin; the general direction of it from Calicut to the latter place is S.S.E., but varies at different parts between S. by E. and S.E. by S. The depths are 20 and 22 fathoms 6 leagues off shore, the low land then just visible from the deck; and 30 or 32 fathoms is about 8 leagues from it. From lat. $10^{\circ} 30' N.$ to the parallel of Cochin, the edge of the bank has a steep declivity, from 36 or 40 fathoms to 100 fathoms, no ground, about 9 or $9\frac{1}{4}$ leagues off shore.

Narrakel Flag-staff, in lat. $10^{\circ} 2' N.$, marks this new port, which the Cochin Rajah has established as a safe place (like Alippee) during the S.W. monsoon, when there is no surf on the beach, and easy communication can be had in any boats, as the water is smooth under a depth of 3 fathoms, owing to the **mud flat**, which lies off this part of the coast. The position of the place is pointed out by the flag-staff, and by the Cruz-Milagre Gap, a conspicuous opening in the belt of cocoa-nut trees, which however is not seen till the ship is abreast of it, when coming from the S., but the Cochin Light-house is a good guide, being only 4 m. from Narrakel.

Narrakel Anchorage in bad weather, or during the S.W. monsoon, serves as a sort of refuge

for those ships which cannot remain in Cochin Roads. When a S. or a S.W. gale comes on, they should weigh (with ebb tide if the wind be scant), and steer to N.W. by N., till abreast of Narrakel; then run in to 4 or 5 fathoms, which is nearly 3 m. off shore, with the flag-staff between E. by S. and E.S.E., and the Cochin Light-house about S.E. by S. Boats communicating with the shore should steer direct for the flag-staff, where they can be safely hauled up, and should avoid the heavy outer surf line as far as possible. Cochin can be reached in two hours; provisions and water easily obtained, and repairs or refitments can be done.

COCHIN (the flag-staff) is in lat. $9^{\circ} 58' N.$, lon. $76^{\circ} 15' E.$, bearing from Alipee N. by W. 29 m. This port belongs to the British Government, and has a master attendant, a magistrate, and pilots. The English territory is very limited, and all on the S. side of the river entrance. The adjoining land belongs to the Rajah of Cochin. The British Resident or Commissioner has a large house on Balgotti Island, nearly 2 m. N.E. by E. of Cochin. There are many English and Dutch merchants here, with a Government medical officer and hospital, and a custom-house. An electric telegraph has been laid between this place and Point-de-Galle, also to Bombay and Madras. The town, which is situated on the S. side the entrance of the most considerable river on this coast, is a place of consequence as a naval depôt, the country abounding with excellent teak-timber for ship building, and coir for cordage. Several ships have been built here for the merchants of Bombay, measuring from 600 to 1,000 tons. The land at the back of Cochin is all low: and although the houses and the light-house on the sea-face of the town are white, they do not show well, except in the afternoon; but the flag-staff is high above the trees and houses, and easily perceived with a telescope, as signals are always made when ships are in sight.

The Bar at the river's mouth is a narrow strip of sand, having 13 ft. on it at L. W., but the rise and fall being only 3 ft. at spring tides, pilots will only take in vessels drawing less than $14\frac{1}{2}$ ft. The bar is marked by two buoys, the S. one chequered and pear-shaped, the N. one a dull white spire-buoy. The best channel does not always remain at the same spot. There is at times a surf on the bar, occasioned by the strong ebb running out against the sea-breezes when there is any swell outside. Strangers ought, therefore, in running for the river in their boats, to be careful to keep in the proper channel, as several accidents have happened to boats crossing the bar after dusk. The river inside is deep, 7 to 9 fathoms are found abreast of the flag-staff and building yards; vessels are snugly berthed there by the master attendant, and generally load at a pier.

Supplies. Cochin is an important ship-building depôt, and repairs of any nature to sailing vessels can be executed; but teak timber is not so cheap or plentiful as formerly, though other useful woods are procurable. Water, poultry, sheep, pigs, and rice and other provisions in moderation may be procured; but the water of this place is not recommended, unless the supply comes in boats from Alwy, a town several miles to the N.E. of Cochin.

Light. A fixed White light, in lat. $9^{\circ} 58' N.$, lon. $76^{\circ} 14\frac{1}{2}' E.$, is exhibited from sunset to sunrise, on a white column near the beach, to sea-ward of the town, 95 ft. above the sea-level, and seen 14 m. off. This new light-house is 800 yards to S.W. by W. of the Port Flag-staff, where the old light used to be hoisted on the top of an old church-tower.

Anchorage. Vessels should anchor off Cochin with the light-house between E. by S. and E $\frac{1}{4}$ N., in 5 or 6 fathoms, mud, about 2 m. off shore. They should not come under 6 fathoms in the S.W. monsoon, as a heavy swell then rolls in.

Tides. The stream of tide is very strong, and its times of change are very irregular, influenced by the evaporation from, or the fall of rain upon, the immense area of backwater, of which the Cochin river mouth is the outlet. At the anchorage abreast the bar the ebb sets W.N.W., but the tendency of that tide is to the N.W.; its racing over the sand-banks, on the N. side of the river entrance, produces heavy breakers there always, which a ship's boats should avoid.

It is H. W. on F. and C., between 1h. and 2h.; ordinary springs rise $2\frac{1}{2}$ ft., neaps $1\frac{1}{2}$ ft; but sometimes the water remains at the same level (about its mean level) during a whole day by the custom-house tide-gauge. This peculiarity may be attributed to the great evaporation from the immense back-water of Cochin, as above stated; but it is believed that there is a little more rise and fall on the bar, and on the adjacent coast, than inside the river: extraordinary springs rise a little more than 3 ft.

Night tides are highest all along this coast from Nov. to March, and day tides from May to Aug.; in the other months they are about equal.

ALIPEE, or AULAPOLAY, in lat. $9^{\circ} 30' N.$, lon. $76^{\circ} 20' E.$, bearing S. by E., from Cochin, distant $9\frac{1}{2}$ leagues, is the principal sea-port of the Rajah of Travancore. It communicates with Cochin by a canal commencing inshore from the coast about 200 yards, and running into the vast back-water. The place may be known from the offing, in coming from the N.-ward, by a large white house, which is hid by some cocoa-nut trees, when approached from the S.-ward. This village

is situated in the Kingdom of Travancore, and carries on a considerable trade in teak-timber, betel-nut, coir, and pepper. Large ships used to anchor in 5 or $5\frac{1}{2}$ fathoms, with the large white house N.E. by E.; or, a ship not drawing more than 18 ft. water, in 4, or $\frac{1}{2}$ less 4 fathoms, with the flag-staff bearing N.E., distant about $2\frac{1}{2}$ m. It is a safe roadstead all the year round, being fronted by a soft mud-bank, on which a vessel might ride with less risk than at any other part of the coast. A shoal-bank of from 6 to 9 ft. extends about $1\frac{1}{2}$ m. off shore. The cause of this mud bank is supposed by Mr. Crawford (Commercial Agent of the Travancore Raj) to be the greater elevation (by 4 ft.) of water level in the vast back-water, over that of the outside sea; thus the hydraulic pressure forces out mud and vegetable matter through mud volcanoes which (in the S.W. monsoon) form along the beach, and in the shallow water. Mr. Crawford also by boring found evidence of a subterraneous communication through mud between the back-water and the sea. This may account for the accession of mud, but doubtless (as explained by the Editor of this book, who surveyed Alıpee about 16 years ago) the monsoon swell keeps this accumulated mud so stirred up as to deaden its activity and produce the remarkably smooth water which constitutes **Mud Bay** (as it was called by the pioneers of commerce on the Malabar coast) the safest harbour along it.

Anchorage. During the S.W. monsoon, although the surf breaks on the shore to the N. of this place, and the sea is white with foam outside, there is at Alıpee a large extent of smooth water, on the outer part of which a vessel may conveniently anchor in $4\frac{1}{2}$ fathoms, and keep up a communication with the shore. In the fine season, a vessel, not drawing more than 18 ft. water, may anchor in 4 fathoms, or a trifle less, the bottom being such soft mud.

Vessels anchor with the flag-staff bearing about E. by N. to N.E. by E.; but, as the mud-bank changes its position, advice should be taken from the master attendant, whose boat is sure to communicate with every ship. When, during the S.W. monsoon, trade cannot sometimes be carried on at Cochin, the port of Alıpee is always available; and the back-water and canal communication between these two places is an immense advantage.

Light. Alıpee has a flag-staff which shows above the trees, and near it, a white light-house, 85 ft. high. It has a revolving white light, attaining its greatest brilliancy every minute. The light is of the second order, elevated 100 ft. above mean sea-level, and should be seen in clear weather 15 m.

The Coast. Between Cochin and this place the coast is very low, covered with trees, and may be approached to 6 fathoms in a large ship, the bank being very even to 5 fathoms, about 1 or $1\frac{1}{2}$ m. from the shore. H. W. on F. and C. at 1 h. 30 m.; rise about 3 ft.

Porca, or Pooracaud, in lat. $9^{\circ} 21' N.$, bearing about S. by E. $\frac{1}{2}$ E., 3 leagues from Alıpee, is another village belonging to the Rajah of Travancore, of considerable extent, but the houses are not easily seen except when near the shore. Coir, plank, or timber for ship-building, and pepper, are exported from these places, and from some of the adjacent ports. The coast continues low and uneven, safe to approach to 5 or 6 fathoms. The anchorage is opposite the village in $5\frac{1}{2}$ or 6 fathoms, $1\frac{1}{2}$ or 2 m. distant. Between Alıpee and Porca a village named Crahal is situated, with cajan storehouses close to the water's edge: it carries on some trade. **Carunapale** lies to the N. of Iveker River, and when running along the coast in 8 fathoms, it may be easily distinguished by a considerable opening like the mouth of a river.

Iveker or Aybika River, in lat. $8^{\circ} 56\frac{1}{2}' N.$, lon. $76^{\circ} 32' E.$, is 4 m. to the N.W. of Quilon, and has on its banks a village of the same name, subject to the Rajah of Travancore. The river has a wide entrance, communicating with several other rivers, one of which extends parallel to the coast, and unites with Cochin River, forming a safe inland navigation. This place admits only boats over the bar at the entrance, there being but 5 or 6 ft. on it at H. W., and the bottom consists of hard sand and gravel, as far out as 8 fathoms. A large ship touching here to take in plank, or other articles, may anchor in 7 fathoms, with Quilon Point bearing S.E. by E., and the middle of Iveker River's mouth N.E. by E.; or in 6 fathoms hard sand, with the river's mouth N.E. $\frac{1}{2}$ E., and Quilon Flag-staff S.E. by E. $\frac{1}{2}$ E., off shore about $2\frac{1}{2}$ m. It would not be prudent to go farther in with a large ship. The soundings are very irregular under 8 fathoms, particularly to the N.-ward and S.-ward of this anchorage, having coral heads of 2 to 4 fathoms nearly 2 m. off shore. There is here some export trade of timber, pepper, ginger cardamoms, lac, and turmeric. The bar of the river has little more than 1 fathom at high tide; within the entrance, the area of shallow water is very great, and there is canal communication with Cochin to the N., and Trivandrum to the S.

The Coast from Iveker River to Cochin is all sand, and fringed with cocoa-nut trees. The town of Purcaud or Porca, lying 9 m. S. of Alıpee, has a considerable trade in coir, timber, pepper, &c. The sea coast of the Travancore Rajah's dominions terminates about midway between Alıpee and Cochin. Alıpee bears N.N.W. 40 m. from Quilon Point. The coast between, except near

Tangacheri, is sandy, and nearly straight; but 10 m. N. of Quilon there is a slight indent, which does not, however, amount to 1 m. from a straight line drawn between the two places. The shore is safe to approach into the depth of 5 fathoms, mud; but it must be remembered that towards Alipée this depth is found nearly 3 m. off.

QUILON or QUILON (the Tangacheri Fort), in lat. $8^{\circ} 53\frac{1}{2}'$ N., lon. $76^{\circ} 34'$ E., bears S.S.E. about $10\frac{1}{2}$ leagues from Porca; the coast between them is low, covered with trees, and may be approached to 6 fathoms, till near the entrance of Iveker River. Quilon Bank, of hard ground, extends from Iveker round Quilon Point, where it becomes very uneven, and dangerous to approach under 12 or 13 fathoms; for under these depths, abreast the Point, there are sudden overfalls from 9 to 4, 3, and 2 fathoms rocky bottom. The reef or foul ground of Quilon should not be approached under 12 fathoms. Quilon, or properly Koilon (in ancient maps Coulan), bears from Anjengo N.W. $\frac{1}{2}$ N. 18 m. A small British force is stationed here; the ground on which the cantonment stands rises by a gentle ascent from the sea, above which it is about 40 ft. Between Anjengo and Quilon the coast forms a bight, which is deepest about 5 m. S.E. of the latter place, at which spot an extensive back-water makes a gap in the line of trees fronting the coast.

Quilon Point is a projecting part of the coast, and the outer point, which is called Tangacheri, on which are the flag-staff and master attendant's house, amongst high cocoa-nut trees, is slightly elevated above the adjoining land. One large bushy round tree above the rest may be seen beyond 10 m. from a ship's deck; the flag-staff cannot be seen so far off unless the colours are hoisted. This point is about 2 m. W. of Quilon cantonments, where another flag is hoisted by the commandant of the troops. The coast for more than 2 m. N. of Tangacheri flag-staff is rocky and slightly elevated, having half way along it a white church, which in the afternoon shows well.

Tangacheri Reef. Quilon, besides being a very projecting point of the Travancore coast, is rendered still more unsafe to approach by the bank of hard ground, called the Tangacheri Reef, extending $1\frac{1}{2}$ m. to the S.W., and 3 m. to the W. of the Point, and 6 m. along the coast to the N.-ward. The bank should not be approached under 13 fathoms water by day, or 17 fathoms at night, as it is deep-to. In standing to the N.-ward along the coast at night with a fresh land-wind, be careful to increase the distance from the shore as the vessel approaches Quilon.

Anchorage. To the S.E. of the reef the coast forms a bight, where ships may anchor off the town and military station of Quilon, in 5 or 6 fathoms, sand, with Tangacheri flag-staff bearing N.W. 1 m. distant; but as there are rocky overfalls a little to the E. of this position, and the master attendant's boat will always come off, it is better to wait for that officer to berth the ship. During the fine season from Nov. to April, trading or trooping vessels can lie close in-shore in safety. The point and reef shelter this anchorage from N.W. winds; but if the weather is cloudy and unsettled, it will be prudent not to place the ship too close to the shore.

Soundings. The bank of soundings off Anjengo extends 25 m. from the main; off Quilon 28 m.; off Alipée 30 m.; and off Cochin 35 m. Off Quilon Point there are 20 fathoms at 5 m. off shore; but farther to the N. that depth will be found farther from the coast: off Alipée there are 20 fathoms at 12 m. distance, and off Cochin the same depth at 16 m.

There are 10 fathoms only 1 m. off Anjengo, but farther to the N. that depth is 2 m. off shore; abreast Quilon Point there are 10 fathoms on the foul ground 3 m. from land; to the W. of Iveker River at 4 m. from land, and so gradually increasing its distance, until at Alipée there are 10 fathoms as far as 8 m. from the coast; above this latter place the 10 fathoms line runs N. $\frac{1}{2}$ W., again approaching the coast, until off Cochin it is $5\frac{1}{2}$ m. from land. Thus it will be seen that the bank, of such soundings as the hand-lead will give, extends farther off Alipée than off any other place yet described.

To the N. of Iveker, as far as Calicut, the soundings are all regular, and the bottom mud; whereas below Quilon to Cape Comorin it is sand, and rocky in many places.

ANJENGA, or ANJENGO (the Fort), in lat. $8^{\circ} 40'$ N., lon. $76^{\circ} 45'$ E., bears from Quilon S.E. $\frac{1}{2}$ S., distant 6 leagues; when 3 m. to the S.-ward of the latter, the coast may be approached to 10 fathoms, which will be $1\frac{1}{2}$ m. from the shore. In clear weather it may be known by a remarkable peak of the Ghauts, sometimes called Anjenga Peak, about 8 leagues inland, higher than the adjoining mountains, which is in one with the fort bearing E. by S. This peak (the name of which is Cuchi-Mulla) may be seen from abreast Quilon, and off Cape Comorin.

Anjengo Flag-staff is between 4 or 5 leagues to the W.N.W. of Trevandrum Observatory, and bears from Covilum Point N.W. $\frac{1}{2}$ N., 20 m.; but, as the fort and a few houses (that are visible through the trees) are low, this place is not easily distinguished from even a short distance. A church with a white front will be seen on the beach 2 or 3 cables' lengths to the N.W. of the fort, and a bungalow on the hills 2 m. N. of it. There is some red table-land about 4 m. to the N. of Anjengo, which may denote the approach to it in coming from the N.; this and other similar

table-land along this coast, being much higher than the cocoa-nut trees, when seen from a ship's deck at a greater distance than 7 m., give the mariner an idea that these red cliffs come down to the water's edge; whereas the shore is all sandy from Covilum to Quilon.

The Anchorage off Anjengo under 10 fathoms is foul rocky ground; but outside of that depth the bottom is sand and shells. Ships ought, therefore, not to anchor under 10 or 11 fathoms, the ground being good in these depths. A convenient berth is with the Flag-staff about N.E. by E., and Brinjall Hill about S.E. by E., in 11 or 12 fathoms mud, off shore 1 m. Coir may be procured here, but the water is indifferent and scarce, and few articles of refreshment are to be obtained: ships load pepper here, and at Quilon, also at Calicut. Tellicherry, and Mahe, which is brought off in tonies or country boats, adapted for passing through the surf. There is said to be fresh water at the Red Cliffs to the N.-ward of Anjenga, but it cannot be got conveniently; a considerable surf generally prevailing on the coast, particularly to the S.-ward, renders it frequently unsafe for ships' boats to land. The depths of water between Cochin and Anjenga are 20 and 22 fathoms, from 2 to 2½ leagues off, 30 to 34 fathoms about 5 and 5½ leagues; and the edge of the bank of soundings is distant 9 or 10 leagues from the shore. There is an admirable system of inland communication by canal and natural back-water, in fast-pulling boats, from below Anjengo through Quilon and Alipee to Cochin, and 50 m. beyond.

TREVANDRUM OBSERVATORY, in lat. 8° 30½' N., and lon. 76° 57' E., established by the Rajah of Travancore, is situated on an isolated hill, about 2½ m. inland, and to the N. of Trevandrum Town, and 196 ft. above the level of the sea.

Trevandrum, the capital of the independent principality, Travancore, and the seat of the British Residency, is 5½ m. N.N.W. of Covilum. The town is of considerable size, having its greatest length N. and S.; on the latter extremity stands the fort, about ¼ m. square, on ground elevated 100 ft. above the sea. The Rajah's palace, within its precincts, is a large handsome edifice in the European style; it is a little way inland, more than 2 m. from the sandy beach of Pondera, or Pootoray. The Trevandrum Observatory is on a hill, more than 2 m. N. of the capital, and 200 ft. above the sea; its two white domes are very conspicuous, but having been established since the province was surveyed, its position is not accurately defined.

Pondera, off which vessels communicating with Trevandrum should anchor, has a flag-staff on the sandy beach, which bears N.W., and is 5 m. from Covilum, and is 2 m. to the S.W. of Trevandrum Fort. No ship's boats should attempt communication with the shore, when there is a heavy surf in the N.E. monsoon. The coast is sandy, with cocoa-nut and other palms.

Anchorage. As the shore is deep-to, a vessel should anchor in 12 fathoms, sand, ¼ m. from Pondera Flag-staff bearing N.E. and nearly in line with the Observatory.

Mountains. Inland of Trevandrum the Ghauts are of great elevation; Cuchi Mulla, the highest peak (called sometimes by early navigators, Anjengo Peak), is more than 4,000 ft. high, and bears N.E. by E. ¼ E., distant 21 m. from the beach by Pondera Flag-staff. Between this high range and the coast some small hills appear, the most remarkable of which is Naimun Hill, or Makunamulla, a regular sloping round mount about 600 ft. above the sea, called by former navigators Brinjall Hill. This Hill bears E. from the anchorage off Trevandrum, and being only 5 m. from the sea, is visible at a considerable distance from the S., and from Anjengo Road-stead. There are little white churches in almost every village along this coast. Between Ruttera Point and Anjengo, the land, at the back of the cocoa-nut trees which fringe the coast, is hilly and undulating.

COVILUM, or RUTTERA POINT, in lat. 8° 24' N., lon. 76° 58' E., bears S.E. ¼ S. from Anjenga, distant 6½ leagues: it is a piece of low, level land, terminating in a bluff, fronting the sea, higher than the contiguous coast, but projects very little. About 3¼ m. to the N. of the Point, there is a village, established not long ago by the Rajah of Travancore, called Pondera, having a high flag-staff with several straggling buildings between it and Anjenga. The coast in this space is low, and abounds with trees; it is bold to approach, having 12 or 13 fathoms at a mile distant, 25 or 26 fathoms about 2 and 2½ leagues' distance; and the edge of the bank of soundings is about 9 leagues distant from the shore. Covilum, or Ruttera Point, bears from Enciam Islet about N.W. ¼ W. 16½ m. The coast between them, except near Covilum, is sandy, nearly straight, fronted with cocoa-nut trees, and safe to approach. Covilum is a piece of low level land terminating in a bluff cape higher than the contiguous coast, but it projects very little, and has a building upon it; there are three little projecting points close to the S.E. of it, and at the distance of 3 m. another point, 1 m. to the E. of which is the village and back-water of Karuchel.

We formerly described a point called Veniam as 7½ m. to the S.E. of Ruttera Point, and "formed of steep bold land, or reddish cliffs, considerably elevated, having on the N. side a small river, and a village at the N. extremity of the high land that forms the point." This is evidently

a description of the Colatur Hill and the Village of Powaur as seen from the S., from which point of view the Hill would look like a point projecting to N., if the vessel was far enough off to dip the trees. The coast-line hereabouts, according to Captain Selby's survey, is all sandy, and fronted with cocoa-nut trees. Colatur Hill (formerly called **Point Veniam**) bears from Enciam Islet N.W. $\frac{1}{2}$ N. distant 8 m. From Point Veniam the coast takes a direction about S.E. by E. to Cadiapatam Point, 6 leagues; the land facing the sea is mostly steep and high, of red appearance in some places. About half-way between them, the **Island Enciam**, having a church and some other buildings on it, is situated near the shore, and rocks above and under water project from it to a small distance. To the N. of these lie the town and river of **Tengaypatnam**; this river having a bar at the mouth, can only be entered by large boats in the rainy season, although navigable inside at all times, and extends a considerable way inland. There are several small villages and churches along this part of the coast, and some of these *ancient* Nestorian churches may be seen interspersed along the shore from hence to Cape Comorin. A little to the E. of the Island of Enciam, the steep land near the sea has a red aspect (resembling that about Point Veniam), between which and Cadiapatam Point is situated the village Kolatchy or Colachul, where the coast forms a small bay, or concavity. Kolatchy Church is in lat. $8^{\circ} 10\frac{1}{2}'$ N.

ENCIAM ISLET, in lat. $8^{\circ} 12\frac{1}{4}'$ N., lon. $77^{\circ} 9'$ E., is $5\frac{1}{4}$ leagues to S.E. of Ruttera Point, and bears from Cadiapatam Point N.W. by W. 10 m.; this Islet is rocky, has a church on it, and lies about $\frac{1}{2}$ m. off the sandy shore; rocks, above and below water, project from it to a small distance. A little to the E. of the Islet the steep land near the sea has a red appearance; indeed there are numerous patches of red land between Comorin and Quilon, but cocoa-nut trees fringe the most part of the coast. A depth of 18 fathoms will be found close to the outer rocks off Enciam; at night a vessel should not shoal under 20 fathoms, which depth is only 2 m. from the rocks.

COLACHUL. This place is on the shore just half-way between Cadiapatam and Enciam Islet; off it there are several rocks above and below water. At the village of Colachul, troops sometimes embark in the fine season, the out-lying rocks forming a partial break-water, within which landing is comparatively easy. There is a remarkable tree on the undulating ground of Aunipauri Hills, elevated more than 250 ft. above the sea, bearing from Enciam Islet N.E. by E. $\frac{1}{2}$ E. $4\frac{1}{2}$ m., and about 4 m. to N. of Colachul Village.

Colachul, in lat. $8^{\circ} 10'$ N., lon. $77^{\circ} 14'$ E., is about 25 m. from the foot of the Asambu Hills, a new coffee-growing district of Travancore, between 2,500 ft. and 3,500 ft. above the sea-level; and the coffee is now exported direct from this place. The first British ship called there in March, 1871, and others have been since. There are no port-dues at Colachul as yet, nor has the anchorage been properly surveyed; but ships of good size can sail between some of the outlying rocks, and ride at anchor to leeward of them in smooth water.

Anchorage. Anchor with the tree N. by E., and the highest part of Cadiapatam Red Point E.S.E., in 11 or 12 fathoms water, which position will be $3\frac{1}{2}$ m. to the N.W. of Kotah Rocky Islet. Native pilots can take the vessel further in to a good berth.

CADIAPATAM POINT, in lat. $8^{\circ} 7\frac{1}{4}'$ N., lon. $77^{\circ} 18'$ E., bearing W. $\frac{1}{2}$ N. 14 m. from Cape Comorin, and S.E. by E. 10 m. from Enciam Islet, is steep, rather high, and of a very red appearance, with a few trees near its extremity. A heavy surf prevails all along this part of the coast, between Comorin and Cadiapatam, and only catamarans are used by the natives; no ships' boats should attempt landing. To the S.W. of this Point there are two rocky islets about $1\frac{1}{2}$ m. from each other, and distant 1 and $2\frac{1}{2}$ m. from the Point, surrounded by rocks under water, and foul ground; they are named Adumdah and Kotah. About 1 or $1\frac{1}{2}$ m. S.W. by S. from Adumdah Islet, and $2\frac{1}{2}$ m. from the Point, lies the **Crocodile Rock**. From this rock, the extreme low point of Cape Comorin bears E., distant $5\frac{1}{2}$ leagues, the S.-most high land over the Cape E. by N. $\frac{1}{2}$ N., Cadiapatam Point N.E. $\frac{1}{2}$ N., Adumdah Islet N.N.E., Kotah Islet N.N.W., and the N. extreme of the land N.W. $\frac{1}{2}$ N. Close to it, at $1\frac{1}{2}$ m., there are 13 and 14 fathoms, 17 fathoms about $2\frac{1}{2}$ m. off, 19 fathoms about $3\frac{1}{2}$ m., 22 fathoms about 7 m., and 23 fathoms about 2 m. outside of it, sandy bottom.

CROCODILE SUNKEN ROCK, in lat. $8^{\circ} 6'$ N., lon. $77^{\circ} 15'$ E., bears S.W. from the above point nearly 3 m.; close to it are depths of 14 and 16 fathoms, and 20 fathoms $\frac{1}{2}$ m. outside. A part of this rock appears sometimes above water, but it does not break at all times, nor is it visible at H. W. when the sea is smooth. At night do not approach it* under 25 fathoms water. Between the Crocodile Rock and Cadiapatam Point is the rocky islet Adumdah, and $1\frac{1}{2}$ m. to

* A light has been proposed to be placed near the Crocodile Rock, either on one of the islets or on the main land abreast. Another light has been recommended for Cape Comorin.

W.N.W. of this islet is another called Kotah. Both are surrounded by sunken rocks and foul ground, but there is a channel between the two, and between each and the Crocodile Rock. Kotah bears from the Crocodile N.N.W. nearly 2 m.

The Coast. From Ruttera Point to Cadiapatam Point, the bank of soundings extends about 9 or 10 leagues from the land; 30 fathoms is from 4 to 5 leagues off; 25 or 26 fathoms is $2\frac{1}{2}$ and 3 leagues from the shore, which should not be approached under these depths about Cadiapatam Point, during the night or in dark weather, on account of the straggling rocks off that place: to the W. of these rocks the coast is not so dangerous. In passing between them and Ruttera Point, from 22 to 26 fathoms is a good track with the land-wind; or the coast may be approached to 18 or 20 fathoms occasionally; between Enciam Island and Ruttera Point, a ship may borrow into 16 or 17 fathoms. From Cadiapatam Point, the low sandy extremity of Cape Comorin bears E. by S., distant 3 leagues; the coast between them having a little concavity in some places, is low and sandy close to the sea, rising in a gentle acclivity to the base of the mountains situated a few miles inland. Close to the shore some churches are seen, and 4 m. to the W. of the cape lies the small river Manacoudy, with rocks barring its entrance, and some buildings near it. Between this place and the grove of trees at the village of Cape Comorin, the low country seems divided by a wall or trench, stretching from the shore to the mountains, and fortified by mounds of earth. The land between the Ghauts and the shore, from Point Veniam to Cadiapatam Point, may be seen 7 leagues; and the mountains inland 18 or 20 leagues in clear weather. In passing along this part of the coast, when clear of the rocks off Cadiapatam Point, the shore may be approached to 22 or 20 fathoms toward Cape Comorin, which will be about 5 m. off; but in the night or in hazy weather, it ought not to be approached so close.

CAPE COMORIN, in lat. $8^{\circ} 5' N.$, lon. $77^{\circ} 31' E.$, the S. extremity of Hindostan, is a low sandy cape, with a small pagoda at its extreme point; and (a little to the W. of this) the British Resident's bungalow with a flag-staff. About 2 cables' lengths to the S.E. of the sandy cape is a sloping rocky islet high above water, with other rocks about it, on which the sea breaks. To the W. of the Residency the shore of the cape is sandy and barren, but to the E. it abounds with trees, amongst which, and 3 m. to the N. of the pagoda, is Watakota Fort. The pagoda is a low, white, square building near the water's edge, $\frac{1}{4}$ m. to the N. of which stands the village of Comorin, called by the natives *Cania Gumari*, amongst cocoa-nut trees, with high reddish ground at the back; and $\frac{1}{4}$ m. farther N.E. is another little sandy cape, with rocks off it. The land of the cape rises from the sea with a gentle acclivity to the base of the nearest mount, which is of a sharp conical form, 1,400 ft. above the sea, at 4 m. to the N.W. of the pagoda. It is separated from the range of Ghauts, which at its back rise in majestic sharp peaks, chained together, and forming a ridge, which is in one with the cape bearing about N.

Approaching the Coast from the W., it must be remembered that the above-mentioned isolated conical mount can never be seen, even in the clearest weather, at a greater distance than 35 m. Some prominent peaks to the N. of it may be seen 50 and 60 m., and the most S. visible one may be mistaken for the conical mount by ships passing at a great distance. The most likely one to be mistaken for it is a mountain 10 m. to the N.W. of it, and called Maruvatur; this is more than 2,000 ft. high, and bears from Cadiapatam Point N.N.E. $\frac{1}{4}$ E., distant 9 m. Another peak, called Miandrighiri, between 3,000 and 4,000 ft. above the sea level, bears N.E. by N., distant about 11 m. from Maruvatur.

SOUNDINGS. The bank of soundings extends 50 m. off shore to the S. and W. of Cape Comorin. At the distance of 8 m. from the shore S. of the cape there are 20 fathoms; but farther to the N.W., as far as Quilon, that depth is between 4 and 5 m. off shore, except in the vicinity of Ruttera, where 20 fathoms will be obtained only 2 m. off land. Near Comorin, and by the Crocodile Rock, casts of 10 fathoms are found nearly 3 m. from the main land; but generally between the cape and Enciam there is that depth at 1 and 2 m. distance. Between Enciam and Anjengo, 10 m. is about 1 m. from land. The bottom is sand and shells, with exceptional rocky casts. To the E. of Cape Comorin the bank of shoal soundings extends further off shore, and has more overfalls.

Wadge's Bank. The ship *Shak Allum*, Captain Wadge, from Bombay to Calcutta, in lat. $7^{\circ} 39' N.$, lon. $77^{\circ} 18' E.$, sounded in 17 fathoms, hard rocky bottom, on a shoal of small extent on the bank of soundings, 36 m. S.W. of Cape Comorin. It was examined in 1861, but not less a depth than 14 fathoms was found. This is probably that bank formerly described by Captain Horsburgh as "a great way out from Cape Comorin, and abounding with cod, where some ships have caught considerable numbers of those fish, but it appears to be of small extent and little known."

GULF OF MANAR.—CAPE COMORIN TO POINT DE GALLE.

(VARIATION OF COMPASS, ABOUT $1^{\circ} 0' \text{ E.}$)

The Gulf of Manar is formed by the coasts of Tinavelly and Madura on the W.; the ledge of rocks and islands, called Adam's Bridge, on the N.; and Ceylon on the E. The extreme breadth from Cape Comorin to Point de Galle is 200 m.

The **Tinavelly Coast** is about 85 m. in length; the portion to N. of Tuticorin is low, with cocoa-nut trees fringing it; scarcely any rising ground occurs inland till S. of that harbour at the back of Manapaud Point; but the magnificent ghauts, which, running N. from Comorin are the boundary between Tinavelly and Travancore, form a back-ground, in clear weather, to the otherwise monotonous landscape. Towards Comorin, the ghauts are much nearer to the shore, and always visible. Tinavelly has several minor streams, but only two principal rivers, the Tambaravari, or Tambapani, and the Vypar, falling into the sea, the latter 16 m. to the N. of Tuticorin, the former about half that distance to the S. In the rainy season, the numerous feeders of these two, and other rivers, lay the country in many parts under water, and leave everywhere in the plains innumerable small lakes or ponds. That part of the province to the N. of the River Tambaravari is the more level and fertile and very productive, being extensively irrigated by canals from that river. The S.E. part of Tinnavelly is, however, barren; having a light stony soil; that throughout the province is generally of a deep red or rusty colour, from the presence of iron, and contains a large quantity of sand, forming a friable mould. In the maritime tract on the S.E. coast, there are extensive salt marshes, liable to spread greatly during the rainy season. Of all the products of Tinavelly, cotton is the most important; but the cultivation is restricted to the native plant of India. Rice is the principal alimentary crop, but it sometimes fails to a considerable extent when the rainfall is below the usual average. Pearl-banks exist in the shallow sea both to N. and S. of Tuticorin, but do not produce so great a revenue as those off Ceylon.

The **Madura Coast**, from the Paumben Pass to Vaimbaur, about 50 m., is an extensive sandy plain, without a single hill or conspicuous eminence. The Vygah, the principal river of the province, falls into Palk Strait just to the N. of Tonitorai, the headland which forms the W. side of Paumben Pass. The other rivers are numerous, but smaller, and, though destitute of water in the dry season, have considerable volume during the rains, and must naturally bring down much of the alluvial deposit, which tends gradually to fill up Palk Strait.

CEYLON ISLAND, known as Lanka by the natives of India, lying off the S.E. extremity of the continent of Hindostan, from its peculiar configuration and position nearer the equator, needs some general description, that any points of difference between its seasons and those of Hindostan may be comprehended. Its extreme length N. and S. is 240 geographical miles, and its greatest breadth, on the parallel of Colombo, is just the half of its length. The N. half of the Island is flat and low, but the S. half is mostly mountain region (separated from the nearest ghauts of India by a gap of 200 m.), and from its great elevation and isolated position, by arresting the winds from all points of the compass, causes a considerable amount of rain-fall to be experienced, in some part or other of the Island, during every week of the year. The greatest quantity falls on the S.W. portion of Ceylon in the month of May, when the wind is intercepted and its moisture condensed by the lofty mountain ranges surrounding Adam's Peak.

The **W. Coast of Ceylon** is low near the sea, much planted with cocoa-nut and other trees. Inland, the mountains attain a great elevation; Adam's Peak (the loftiest visible from the W. coast), stands 7,420 ft. above sea level; but, being 35 m. from the nearest sea, it is veiled in haze during the S.W. monsoon, though an excellent land-mark for two-thirds of the year. The culminating peak, however, of Ceylon is Pedrotala-gala, 860 ft. higher than Adam's Peak, and nearly 20 m. farther to N.E. Between Galle and Colombo much elevated country intervenes between Adam's Peak and the coast; the most useful marks are the Haycock and the Hummocks or Knuckles, which, with any other conspicuous hills, will be described under their contiguous ports. To N. of Colombo, the country gets lower and lower towards the N. end of the island. Estuaries of great area, called after ancient Arab navigators "gobbs" (ghubbet), separating large tracts of low land from the main, are the peculiar feature of the N. part of this W. coast of Ceylon. A peculiarity, which is one of the first to strike a stranger who lands at Galle or Colombo, is the bright red colour of the streets and roads, contrasting vividly with the verdure of the trees; the fine red dust penetrates every crevice, and imparts its own tint to every neglected article. Natives resident in these localities, are easily recognisable elsewhere, by the general hue of their dress. This is occasioned by the prevalence, along this W. coast, of *laterite*, or, as the Singhalese call it, *cabook*, a

product of disintegrated gneiss, which, being subjected to detrition, communicates its hue to the soil. Along this W. coast, from Point de Galle to Chilaw, corallines and shells mixed with sand, and particles of gneiss, are found near the shores. But the principal scene of most recent formations is the extreme N. of the island, with the adjoining peninsula of Jafna. Here the coral rocks abound far above H. W. mark, and extend across the island, where the land has been gradually upraised, from the E. to the W. shore. Sand covers a vast extent of the N. sea-board, the peninsula of Jafna, and Manar Island; this is doubtless brought by the currents of the N.E. monsoon from the Coromandel coast, and from the N.W. shore of Ceylon in the S.W. monsoon, across the shallows of Adam's Bridge; this barrier being formed by a long line of sandy embankments, which shift about materially through the force of the ocean swell in opposite monsoons.

Rivers. Nine or ten streams of some magnitude, besides smaller ones, fall into the sea between Point de Galle and Manar. The Gindura near Galle; next to N. comes the Bentotte River; then the Kalu-ganga, or Kalu-oya at Caltura; the Kalani-ganga, or Mutwal at Colombo; the Maha-oya, or Kaymel, near Negombo; and the Dedruoya at Chilaw. The Veluki-ar falls into the Putlam back-water, running N. to the ocean round the N. end of Calpenty Island, whereabouts also is the mouth of the Kala-oya, debouching into the sea at Dutch Bay. Farther to N. are the Moderegam, and the Arive-ar or Aripo River. All these streams are liable, during the fury of the monsoons, to be surcharged with rain till they overflow their banks, and spread in wide inundations over the level country. On the subsidence of these waters, the intense heat of the sun, acting on the surface they have deserted, produces a noxious and fatal malaria, prolific of fevers; and, in some seasons, so deadly is the pestilence, that the Malabar coolies as well as the native peasantry betake themselves to flight. Very few of the rivers of Ceylon are navigable, and these only by canoes and flat boats, which ascend some of the largest for short distances. Those which intersect the great high road from Point de Galle to Colombo are mostly bridged; a bridge of boats connects each side of the Kalani-ganga near the latter place.

Soundings. Off the S.W. coast of Ceylon, the bank of soundings extends nowhere so much as 15 m.; to the N. of Colombo, only about 10 m.; but to less than half that distance off Calpenty and Kara-tivo. From the latter place, the edge of the bank trends N.W. towards Paumben, and at 15 m. S. of that town there is no bottom at 100 fathoms. It is to be regretted that the continuation of the bank off the Tinavelly coast to Comorin, has not yet been examined. Its outer edge cannot therefore be correctly defined, but due S. of Comorin it stretches 45 m. off shore. This bank is doubtless the accumulation (throughout many ages) of the Malabar coast sand, picked out by the ocean swell, and borne along by the S. currents during successive S.W. monsoons. There is very deep water at half-way between Comorin and Galle, where the E. I. O. steamer *Zenobia* failed to obtain bottom at 500 fathoms.

The Pearl Banks of the Ceylon coast extend several miles to the W. and S. of Manar Island, but are not specially depicted on the charts; many of those, however, of the Tinavelly coast between Paumben and Trichendore are laid down. More care than formerly has of late been bestowed upon the pearl oysters of the Gulf of Manar; they occasionally disappear from banks where many an annual harvest has been reaped, and this disappearance is now known to be owing to the recently-ascertained fact that they migrate at times to more favourable situations, for which purpose the oyster can sever its byssus, and re-form it at pleasure; thus it not only possesses locomotive powers, but their exercise is indispensable to its economy when obliged to search for food, or compelled to escape from local impurities. It is also susceptible of translation from place to place, and thus new beds are formed in positions ascertained to be suitable for its growth and protection. The pearl divers are chiefly Tamils and Moors, trained for the service by diving for *chanks*,—shells that are used by the people of India to be sawn into bangles and anklets—which are not only fished up by the divers off the islands of Manar and Kara-tivo, but dug up in large quantities from beneath the soil on the adjacent shores, in which they are deeply embedded, the land having evidently been since upraised. The apparatus employed to assist the diver's operations are exceedingly simple in their character; consisting of a stone, about 30 pounds weight, to accelerate the rapidity of his descent, this is suspended over the side of the boat, with a loop attached to it for receiving the man's foot; also a net-work basket, which he takes down to the bottom, and, throwing himself on his face, fills with the oysters as he collects them; this, on a concerted signal, is hauled to the surface. The divers do not ordinarily remain a full minute below, and the most expert cannot continue at the bottom so much as 90 seconds, nor attain a greater depth than 13 fathoms in the pursuit of their calling. The Gulf of Manar abounds with sharks, but, strange to say, hardly more than one accident is known to have occurred from these creatures during any pearl fishery since the British have had possession of Ceylon.

Winds and Navigation. Point de Galle bears from Cape Comorin S.E. $\frac{1}{2}$ E., distant

66 leagues. Ships crossing from the Cape in the S.W. monsoon ought not to steer a direct course, as they may be liable, *at times*, to experience a current setting to the E. into the Gulf of Manaar; a S.E., or S.E. $\frac{1}{2}$ S. course will therefore be proper, according to circumstances, until they get nearly in the latitude of Point de Galle; they may then steer to the E. and make it in day-light, if bound to the Bay of Bengal or the Coromandel coast; but it will be prudent to approach the coast about Point de Galle with great caution during the night, on account of the rapid currents and sunken rocks interspersed at a considerable distance from the shore. Ships bound to the E. parts of India have no occasion to keep close to the S. coast of Ceylon, at least not to lose time by so doing. The current sets into the Gulf of Manaar only at times during the S.W. monsoon, for it usually runs about S.S.E. or S. between Caltura and Galle. It would be imprudent to make the island of Ceylon to the W. of Point de Galle, for if the wind veer to the S. it might be difficult to get round that place, which has been already noticed, in the directions for sailing from Bombay to the S. in the S.W. monsoon. During the N.E. monsoon, a direct course may be followed from Cape Comorin to Point de Galle; the wind blowing then from the Gulf is generally more fair for ships passing from the former to the latter, than in returning towards the Cape; for in this season, ships keep near the W. coast of Ceylon to Caltura or Colombo, or even to Chilaw, before they stretch across to Cape Comorin. In Dec. and Jan., when the N.E. monsoon blows strong out of the Gulf of Manaar, it is certainly advisable for ships proceeding from the S. part of Ceylon to the Malabar coast not to stretch off until they have coasted along to Caltura; then they may steer over for the Cape close-hauled, and will find the N.E. wind increase greatly in strength as the Gulf is opened. When they approach the land about the Cape, it will draw more to the E., and afterwards become variable, inclining to land and sea-breezes, when near the land to the W. of the Cape Mountains.

About the changes of the monsoons, the winds often prevail from the W. between Cape Comorin and Ceylon, accompanied, *at times*, by a current setting into the Gulf, which renders it advisable for ships passing from the S. part of the island towards the Cape, in Oct., Nov., March, and April, to steer direct from Point de Galle for it. In the two former months, some ships have been set to the E. by the current and W.S.W. winds, so far as to make the coast of India, near Manapaud Point; in crossing from Caltura late in March, the same happened to the *Anna*.

From March to Nov., Westerly winds prevail off the S.W. end of Ceylon; it is then difficult for a ship to get to the W. from Point de Galle, and after April it is too late to proceed from thence to the ports on the Malabar coast, until Oct. is advancing. Even in April, being off the S. or S.W. part of Ceylon, bound to Bombay, if a ship can make considerable progress against the W. winds, it will be prudent for her to pass through the Eight or Nine-Degrees Channel, and to the W. of the Laccadiva Islands, making short tacks occasionally in passing them, to keep up her Westing. She will then avoid being embarrassed by the coast, and probably escape bad weather, which is very liable to happen near it in May; and may reasonably expect to reach her port of destination more speedily than keeping near the land, in the track used during the fair season.

THE INDIAN SHORE.

The Coast from Cape Comorin goes about N.E. by E. to Manapaud Point. The distance is 15 m. to the prominent point, which is 1 m. to S. of the village of Ootaunkudi, and was called East Cape by old navigators, and thence it is 20 m. to Manapaud Point. To the N. of Manapaud the shore is low; but to W., from that place towards Comorin, it rises to the height of 100 or 200 ft. in undulating sandy hills, and the tops of tall palmyra trees are apparent as emerging from them; the back-ground is mostly of a reddish soil, covered with palmyra trees and bushes, and rising gradually to the foot of the ghauts, which at Cape Comorin approach to within 3 m. of the shore. Numerous fishermen's villages and small white-washed churches line the coast, but landing in a ship's boat is at all times a difficult and dangerous operation. The coast from Cape Comorin to East Cape forms in a deep bight to the N. of the former, in which vessels can find considerable shelter from W. winds, but the swell of the S.W. monsoon rolls round into it; therefore no attempt should then be made to land in a ship's boat. The boundary between Tinavelly and Travancore is situated about 5 m. N.E. of Cape Comorin.

East Cape stands 15 m. about E.N.E. from Comorin, and bears about S.W. by W. from Manapaud Point, from which it is distant 20 m. To N. of East Cape a considerable bay is formed, where, in 4 fathoms, a small vessel may find some little shelter from W. winds and their accompanying swell, which is still further broken by the prominence of the shore-reef between Ootaunkudi and Idingikari. This bay was known to former navigators as Covalum. The cape has trees

on it, and near the town there is a tuft of trees elevated more than the other land; to the N. about 3 m. off there is the mouth of a small river.

Shoal. The shore-reef, between East Cape and Idingikari (which is 3 m. nearer to Cape Comorin), extends off a full mile and perhaps more; the latest chart shows that there is not a distance of $1\frac{1}{2}$ m. between the reef and the 12-fathom sounding. This is probably the spot where H.M.S. *Thalia* is said to have seen breakers at $\frac{1}{2}$ m. from her. Cape Comorin bore W. by S. (most probably the isolated conical mount, distant 3 m. N.W. from the low cape, as the latter would have been too far off to be visible), and the extreme eastern land N.E. by N. (probably the East Cape). She sounded, and shoaled her water suddenly from 11 to $3\frac{1}{2}$ fathoms.

MANAPAUD POINT, in lat. $8^{\circ} 23' N.$, lon. $78^{\circ} 3' E.$, 8 m. from Trichendore Pagoda, is a high sandy promontory, based on rock, jutting boldly into the sea, and having a small white-washed church on its summit, visible in clear weather at 12 or 13 m. The breakers extend 3 or 4 m. to the N.E. of this point, and about 1 m. to the S.E. The town of Manapaud may be known by the ruins of a large church half buried in sand, and the mouth of a small river, too shallow for internal navigation, opening into the bay to the N. of Manapaud Point.

Anchorage. There is excellent holding ground in 5 fathoms, mud, to be found near the shore, between the towns of Manapaud and Periatthullay, which are 5 m. apart. This anchorage is only available in the N.E. monsoon. In June, July, and Aug., the heavy sea which rolls in upon that part of the coast, precludes the possibility of any vessel anchoring there; therefore, during these months, when the S.W. monsoon is strong, vessels should anchor off either Alendal, or Penacoi, where the coast, trending more to the N., becomes a weather-shore. But if, in coming from the W., the navigator passes between Manapaud Point and its outer shoals, he must be cautious of the shoal patches off Alendal (*see* page 418), and not come within 5 m. of the shore in passing them, nor bring Manapaud Point to bear to the S. of W.S.W., till the Trichendore Pagoda bears N.W.

Manapaud Outer Shoal. This dangerous shoal has its nearest part at 5 m. to S.E. by E. from the point, and between them a depth of 12 fathoms is found; the same water is to be had all round this extensive shoal. On it are patches of 4, 5, and 7 fathoms. It extends E.N.E. and W.S.W., 10 m., having an average breadth of 1 m. From its centre, a tongue of the shoal projects in a N. direction, the apex of this constituting its N.-most or inner danger, on which is $4\frac{1}{2}$ fathoms, sand; from this part Manapaud Church bears N.W. by W., 5 m., and Trichendore Pagoda (seen in clear weather from above the deck) N., a little W., 10 m. From the central shoal part, where there is 4 fathoms, sand, Manapaud Church bears the same as above, distant 8 m., and Trichendore Pagoda N. by W. a little W., $12\frac{1}{2}$ m.; this latter mark, however, is too distant to be seen in any but the clearest weather. There are many other patches with $5\frac{1}{2}$ and 6 fathoms water, over which a vessel might pass; yet the safest plan, when coming from the W., sailing between the Manapaud Shoals and the point, is not to bring Manapaud Church to the W. of N. till within 2 or 3 m. of the point, and then a course E.N.E. will take a vessel clear. The soundings off the shore, S. of Manapaud, at 1 m. are 6 fathoms, and at 3 m. 9 fathoms, sand and mud.

But if the passage outside the Manapaud Shoal be preferred, a vessel ought not to come under 15 fathoms, which will be 11 or 12 m. off shore, until she has passed Manapaud, when, with the church at that point and Trichendore Pagoda in sight, her position cannot be mistaken. As, however, the soundings outside of the shoal are very scanty, the charts exhibiting no depths beyond 1 m. S. of the central shoalest patch, no very definite instructions can be given.

Coilsinipatam, or Coilesegarapatam, is a town on the sea-shore, a little to N. of Manapaud, and bearing S.W. by S. $7\frac{1}{2}$ m. from Trichendore Pagoda, and nearly 2 m. to the N.W. of the tip of Manapaud Point. Off this town, extending 4 or 5 m. to the N. and E., there is a great extent of foul ground, over which there are heavy breakers in the N.E. monsoon, but it has many small channels which are only known and used by the native craft. The anchorage inside is very insecure, and subject to a heavy breaking sea during the prevalence of E. and N.E. winds.

TRICHENDORE POINT, in lat. $8^{\circ} 30' N.$, lon. $78^{\circ} 7' E.$, lies about 8 m. to N.N.E. of Manapaud Point, and is the next prominent point to S. of Tuticorin, from whose light-house it bears S. by W. $17\frac{1}{2}$ m., and from Coilsinipatam Town S., 4 m. This point is a low rocky bluff headland, covered with sand, and having a remarkable high dark pagoda situated on its extremity, which is seen in ordinary weather from 12 to 15 m., and sometimes even at 18 m. from aloft. The town of Trichendore is situated at the back of the pagoda, and $1\frac{1}{2}$ m. further N., in the bight, lies Virandnapatnam, a town second only to Tuticorin in size and importance, inhabited by fishermen of the Parwa caste. **Trichendore Reef** is a dangerous reef projecting 3 m. to the N.E. from the point, and affording some little shelter for small craft to the anchorage off the large town of **Virandnapatnam**, which is situated in the Bay at $2\frac{1}{2}$ m. W.S.W. from the N. tip of the reef, to round which that town must be brought to bear S.W. by W., as, further to the N., comes the foul ground

of Coilnapatam Reef. To the E. of Trichendore Reef the soundings regularly increase till, at 6 or 7 m. distance, the **Pearl-Banks** are found, little patches with 7 or 8 fathoms water, the surrounding water being from 1 to 3 fathoms deeper. To the S. of Trichendore Point, the foul ground extends about 1 m. from shore till abreast of Alendal Village, off which place there is a small patch of good anchorage at from 1 to $1\frac{1}{2}$ m. off shore, in $3\frac{1}{2}$ to 4 fathoms, mud, with the church bearing W.N.W., distant 2 m.; here a vessel is protected, during S. and S.W. winds, by the projecting part of a reef to the S., which there stretches out to more than 3 m. from the shore.

Alendal Shoals. Eastward of the above anchorage about 3 m., there is one shoal patch of $3\frac{1}{2}$ fathoms with 9 fathoms round it. Another shoal of greater extent and with less depth of water, viz., 2 and $2\frac{1}{2}$ fathoms, lies about 2 m. to the S.E. of the above anchorage, and 6 m. N.E. of Manapaud Point. Both these shoals are situated about 4 m. to the S.E. of Trichendore Point, A third shoal, with $4\frac{1}{2}$ fathoms, bears E.S.E. 3 m. from the pagoda.

Coilnapatam, or Coilpatam, is a considerable town 4 m. S. of Penacoil Creek entrance; and Coilnapatam Point is $1\frac{1}{2}$ m. N. of the town. The coast is sandy, with cocoa-nut trees, and there are some hills a little way inland. Between the outer reef and the shore-reef there is only water enough for coasting craft, but the outer reefs break the swell, and render the water much smoother inside. **Coilnapatam Reef** is dangerous, and commences at $2\frac{1}{2}$ m. N.E. by N. from the town, with 10 ft. water on its N. extremity, and extends (with the exception of a break off the little Parwa Village of Alendal) as far as Manapaud Point. The outer edge lies from $1\frac{1}{2}$ to $2\frac{1}{2}$ m. off shore, and has, in heavy weather, a high surf rolling over it in $2\frac{1}{2}$ to 3 fathoms, but ordinarily the sea only breaks on an inner ledge, in from 2 to 12 ft., from 2 to 4 cables' lengths within the former. Many small channels exist between the rocks composing the reef, of which the dhonies, or small trading craft, take advantage, but the channel inside is not good. The mark for the largest channel is the Periamalia Hill (the highest of the two most conspicuous, and often the only hills visible inland) anywhere between the two large trees at the town of Coilnapatam.

PENACOil, is a small fishing village, situated about 1 m. from the sea, whence it is approached by a creek, the mouth of which bears S.S.W. $\frac{1}{4}$ W. $9\frac{1}{2}$ m. from Tuticorin Light-house. Penacoil is easily distinguished by the ruin of an old square-built church, with a scanty tope of palmyra trees on the beach to the S.-ward of that building. **Coil or Kayal**, the great emporium of trade, mentioned as "*the Key of Hind*" by Marco Polo, in the 12th century, lies between Penacoil and Tuticorin. The ruins of the ancient city are about 2 m. from the sea, near the mouth of the Tam-bapani River. Tuticorin (though its roadstead is no better than that of Coil) is now the principal port of Timvelly.

Anchorage. Off Penacoil, there is anchorage in 4 fathoms, rather more than 1 m. from the shore, with the tope, or plantation of trees, bearing W.; where, with the wind at S.W. to S., vessels will be protected by the Coilnapatam Reef. Extending to the E. beyond the above anchorage, there is a natural deep basin, which is $4\frac{1}{2}$ m. in length E. and W., and averages $1\frac{1}{2}$ m. in breadth; the bottom is fine sand and mud in 7 fathoms on the W. side (at the distance of 2 m. E. of the Penacoil tope), and 18 to 20 fathoms on the E. extreme, from which it suddenly shoals to 9, 8, and $7\frac{1}{2}$ fathoms on a pearl-bank. When standing up the coast during the night, with a scant wind, this is good ground for ascertaining a vessel's position, as there is no spot like it between Paumben and Cape Comorin. From the outer part of this deep basin, the anchorage off Tuticorin bears N. by E. $9\frac{1}{2}$ m. In the daytime the high Ghauts are visible to ships navigating this coast; and there are some nearer hills, one of which, bearing about W. by N. from Penacoil, was called by old navigators Penacoil Peak.

Mooram-Shulli-Tivo, nearly 2 m. S. of Devil's Point, is the S.-most of the islets that front Tuticorin, and is also the S.-most island along the Indian shore of the Gulf of Manar. Numerous pearl-banks lie from 3 to 9 m. to E. of these islands. The greatest depth at L. W., in the channel across the sandy barrier between this islet and the main land, is 13 ft., at the distance of 4 or 5 cables to the S. W. of it. To the N. of the barrier towards Devil's Point the water deepens. From a short distance to the S. of this islet till abreast of Penacoil tope, there are occasional patches of rock found; but the anchorage is good in general, along this part of the coast in $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms, mud, between $1\frac{1}{2}$ and $2\frac{1}{2}$ m. from the shore.

TUTICORIN TOWN and HARBOUR. This, the largest commercial town on the Indian shore of the Gulf of Manar, is situated 18 m. to N. by E. of Trichendore Point, and bears from Vypar Point S.S.W., 14 m. The land about Tuticorin is low and sandy, with palmyra trees near the town; on the N. side of which there are a flag-staff, a tower on the beach, and a Protestant church; on the S. side there is a Roman Catholic church, with some screw-houses where cotton is pressed. The harbour is fronted by several low islands and banks, running N. and S., or parallel with the shore, at about 2 m. distance. Outside of these banks is Tuticorin roadstead, with

anchorage in 5 to 6½ fathoms, sand. On the N. point of one of the islands, called Paundian-tivo, or Hare Island, there is an obelisk, from which a light is exhibited. There are two channels for small craft into Tuticorin Harbour, but that to the N. is so intricate as to be seldom used. The S. channel leads between the S.-most island and the main land; the reef connecting them has to be crossed in 12 to 14 ft. water, at a distance of from ¼ m. to 1¼ m. of the island. This being passed, a course may be steered for Devil's Point on the main land, after closely rounding which, a small vessel may stand direct for the town of Tuticorin, carrying soundings of 11 to 9 ft. Before passing Devil's Point, a depth of 2½ fathoms is found, sand and mud. Devil's Point, (close to which vessels must pass in entering Tuticorin Harbour by the S. entrance) bearing S.S.W., and distant 1¼ m. from the light-house, is a low sandy cape, with sparse bushes on it; the shore, inland of it, is swampy and intersected by creeks. The channel, between the point and the islet of Krangit-tivo, has a width of only 8 cables' lengths.

Light. The obelisk, in lat. 8° 47' N., lon. 78° 11' E., on which the light at Tuticorin is exhibited, is octagonal: the light is *fixed*, at an elevation of 43 ft. above H. W., and is visible about 12 m. off from a vessel's deck. The town of Tuticorin bears W. by N. 2¼ m. from the light.

Outer Anchorage. The best anchorage in the roadstead is in from 5½ to 6½ fathoms, with the light-house from W.N.W. to W. by S., distant about 1½ m. During the months of Aug. and Sept., when strong winds are invariably from the land, vessels may anchor in 5 fathoms, but should not approach closer than that depth, as a ledge extends from ¼ m. to 1 m. outside the islands, with uneven soundings of from 10 to 20 ft. water on it. In making the port at night, a vessel may anchor with the light bearing from W.N.W. to W. by S., about 2 m. off, where good holding ground will be found, in 6 to 6½ fathoms. At 8½ m., distance, on the same bearings, the ground is foul on pearl-banks. In approaching from the S., the light may be kept about N.N.W., till within 3 or 4 m., when the above anchorage may be selected. When coming from the N., a vessel may keep the light bearing about S.W. till within 3 or 4 m., when she must steer more out for the anchorage; but, in no instance, ought the water to be shoaled under 6½ fathoms, excepting with the bearings on for the anchorage, and then not under 6 fathoms.

In the N.E. monsoon, vessels should lie with a good scope of cable out; as, although the seas are not heavy, they are sharp, and occasion a chain to jerk. The sea-breeze, at this time, blows on to the reef; and a second anchor, with chain ranged, ought always to be kept ready for letting go.

In the S.W. monsoon, which usually lasts from the middle of May to the middle of Aug., this port may be made without fear; for, although the winds are very violent, they are invariably off shore from W. to S.W., accompanied by smooth water. At this time, vessels may approach the reef to 5 fathoms water, but should always have a stream anchor to sea-ward, as, occasionally during the lulls of the monsoon, a light air comes in from the E.

Tides are very irregular; the flood sets to the N., and the ebb to S.; past Devil's Point they run 8 knots an hour. Spring tides rise 2½ ft.; neaps 1½ ft. H. W. at F. and C. occurs at 1h. 15m.

General Directions. In the N.E. monsoon, vessels from Europe, bound to Tuticorin, should keep the W. coast of Ceylon in sight as far N. as Calpentyne, or until they can fetch across to Tuticorin. In going from Bombay or the Malabar Coast at the same season, after rounding Cape Comorin, the Indian shore may be kept aboard till abreast of Manapaud Point; a vessel may then stretch across to the Ceylon coast with advantage, and probably on the next tack to the N.W. she will fetch Tuticorin. In the N.E. monsoon, that is, from Nov. to March inclusive, fine weather with land and sea-breezes will be found to prevail on the Ceylon side of the gulf, where good anchorage may always be selected between Colombo and Chilaw, at 1¼ to 3 m. off shore, in 6 to 9 fathoms, sand. Vessels, wishing to beat up during the first three months, Nov. to Jan., ought therefore to keep over on the Ceylon side till they have advanced sufficiently far to make certain of their port, if bound to Tuticorin, as the breezes on the Indian coast may be expected to blow steadily and strong from N.N.E., with a strong lee current. In navigating the W. side and head of the Gulf of Manar, great attention must be paid to the lead; and, unless they have a good pilot on board, or good charts, vessels should not shoal to less than 18 or 20 fathoms, below Manapaud, nor to less than 12 fathoms to the N. of that place. The currents are so irregular in their direction and velocity, that no reliance can be placed on their exact set.

In the S.W. monsoon a ship, on leaving Tuticorin, ought to keep over on the Indian side till near Manapaud Point, whence she will generally be able to fetch to windward of Colombo, and be clear of all dangers along the W. side of Ceylon.

In the S.W. monsoon, when bound to Tuticorin, from whatever port they may come, vessels must sight and round Cape Comorin, and keep along the Tinavelly coast. Some few years since, it was considered a hazardous undertaking for vessels of any size to proceed far up the Gulf of Manar; more particularly during the S.W. monsoon, when it was supposed to be impossible to

beat out again. Later experience, however, has shown that no dangers exist that may not be avoided by ordinary care and attention; and that, as regards working to windward against the monsoons, no difficulty will be experienced if the instructions be attended to.

VAIMBAUR. This town, at which is the boundary between the provinces of Madura and Tinavelly, bears about W. by S. $\frac{1}{2}$ S., 18 m. from Valinukam Point. The intermediate coast, which is all low and sandy, well planted with palm trees, forms a considerable bight, at the distance of some 4 or 5 m. N.E. of Vaimbaur. Scattered shoal banks extend off this shore for more than 5 m., therefore no vessel should attempt to sight the land. The **Vypar River** falls into the sea between the village and the point of the same name, which bears S.W. $\frac{1}{2}$ W., $7\frac{1}{2}$ m. from Vaimbaur. This is a very shallow coast, the line of 3 fathoms water being 3 m. off shore; one shoal patch, having only 9 ft. water, lies 5 m. E. of Vypar Town. To the S.S.E. of Vypar Point there are two or three sandy low islets, called **Chully-tivo**; the outermost of these is in a straight line between Vypar and Tuticorin Light-house, distant from the former $3\frac{1}{2}$ m., and from the latter 10 m. Nearly 5 m. W. of this outer islet, the coast forms a deep bight, at the bottom of which stands the town of Putnurmudur, having some large clumpy trees which are visible 9 or 10 m. off shore, when no other land-mark is visible. As a rule, vessels of size ought not to approach the land, above Tuticorin, nearer than 6 or 7 m., on account of the scattered shoal having less than 3 fathoms on them.

VALINUKAM POINT, in lat. $9^{\circ} 9' N.$, lon. $78^{\circ} 39' E.$, is 2 m. W. of Anapar-tivo, and bears E. by N. $\frac{1}{2}$ N., 18 m. from Vaimbaur. The town of Valinukam is more than $\frac{1}{2}$ m. within the point, but access to it from the sea may be had at a less distance on its N. side, as it lies on the shore of the considerable bay formed to the N. of the point. **Nulla-tani-tavo**, or Fresh water Island, bears S.W. by W., 5 m. from Valinukam Point, and 7 m. W.S.W. from Anapar-tivo. It is abreast of Keelcaud, or Keelakari Point, distant about $1\frac{1}{2}$ m. The soundings are tolerably regular off it, but no large vessel should come under 7 fathoms. There is a very small islet 2 m. W. of it, and another beyond, called Oopu-tani-tivo, or Salt-water Island, in contradistinction to Fresh-water Island, from which it bears W. by S., 5 m.

Anapar-tivo. This little island, lying 2 m. E. of Valinukam Point, has a reef encircling it, and shoal water extending 1 m. to the S.W., between which and the point is the W. entrance of the inland navigation along the Indian coast, by which small coasting vessels are enabled to work in smooth water for half the distance between Paumben and Tuticorin. To the S. and W. of this islet, there are overfalls in the soundings, owing to the many pearl-banks; one shoal patch, with $3\frac{1}{2}$ fathoms, lies 5 m. S.W. from Anapar-tivo, and 3 m. E. of the S. end of Fresh-water Island. There may be other shoals between this and Tuticorin Harbour, but the bank of soundings has not been thoroughly examined. Therefore no large vessel has any business N. of that commercial port, and it will be a safe rule not to shoal under 12 fathoms above the parallel of $8^{\circ} 30' N.$ latitude.

Islets and Shoals. From Anapar-tivo, the chain of islets and shoals runs in a mean direction about E. by N. for 26 m. to Manauli. The soundings outside them are tolerably regular, but with some slight overfalls in a few places. About 4 m. S.S.E. of Moollee Islet, which is 10 m. to the W. of Manauli, a shoal patch of $2\frac{1}{2}$ fathoms exists amongst soundings of 8 and 9 fathoms, but this is the only dangerous overfall known as yet. No large vessel should, however, shoal under 12 fathoms, or sight these low islands, excepting Manauli and Anapar-tivo.

MOOTAPETTA BAY is a large space of smooth deep water, of 5 and 6 fathoms at L. W. (to the S.E. of the town of that name), bounded on the S. side by **Moollee Islet**, in lat. $9^{\circ} 11' N.$, lon. $78^{\circ} 58' E.$, and on the S.E. by **Moosel Islet**. Between these two islets (which are 5 m. apart) a shallow and narrow bank exists, forming some shelter from the swell of the S.W. monsoon. This bank comes within 12 ft. of the sea-surface in most parts; but, at one spot, which is about $1\frac{1}{2}$ m. to the E. of Moollee, the least depth across is 15 or 16 ft. at L. W. It has been proposed to deepen this to enable large vessels to enter the Bay, which has been named **Port Lorne** by Sir James Elphinstone, who has also proposed cutting a ship-canal (to connect the Gulf of Manar with Palk Bay) through the narrow Ramnad promontory.

GENERAL DIRECTIONS for the INLAND NAVIGATION. Small craft, in working down from the Paumben Pass during the S.W. monsoon, will do well to take a pilot and keep inside the islands and banks, which render the water so much smoother, to Valinukam Point. They can there discharge the pilot, and work down the Indian coast as far as Manapaud Point, when their fetching Colombo on the starboard tack may be considered certain.

In going E. by the inland navigation towards the Pass during the S.W. monsoon, the entrance should be made between Valinukam Point and Anapar-tivo, where the depth is 5 or 6 fathoms, not approaching the latter so nearly as 1 m., till its S. end bears S. of E., when the islet may be passed at half that distance in about 3 fathoms, water, and a straight course at N.E. by E. may be kept

for the anchorage off Keelakari; the general sounding along this line is 3 fathoms, shoaling occasionally to $2\frac{1}{2}$ fathoms, sand; care must be taken to avoid some reefs nearly awash, lying off Yeravadi Point, which is $2\frac{1}{2}$ m. N.N.E. of Anapar-tivo.

Keelakari Anchorage has from $2\frac{1}{2}$ to 3 fathoms, stiff mud, with a detached ruin (E. of the town) bearing N., and some large terraced houses about N.W. Pilots here come on board to take vessels to Paumben, which lies 26 m. farther E.; but, should a vessel proceed without such assistance, the following directions must be followed:—

From Keelakari anchorage steer E.N.E., with Najimundel Point on the port bow, till a small tope of trees (standing between a hillock at the mouth of a rivulet and an old ruined temple) bears N. Then, for the purpose of crossing a sandy spit which has only 7 ft. water in some places, steer about S.E. $\frac{1}{2}$ E., or with the W. extreme of the little island Taliari, one point on the port bow; this will lead over the deepest part of the spit in $2\frac{1}{2}$ fathoms, where a buoy has been placed to indicate the channel. After passing over this spit, the water will deepen to 4 fathoms; two bungalows at the next point E. of Najimundel will then be seen; when they bear N.E. $\frac{1}{2}$ E., steer E.N.E. till they are passed, then a due E. course will take a vessel to the buoys which mark the passage between the shoal banks at Ramasamy's Choultry.

In approaching these buoys, bring the S. one to bear E. by N., when about 3 cables' lengths off, to avoid a sandy knoll with only 7 ft. water; haul more N. as the buoys are approached, and, after passing between them, steer on about an E. course for a high beacon erected on a patch of rocks, about 2 m. to the N. of Manauli Island. Passing about half a cable's length to the N. of this beacon, stand on for the N. end of Pullee Islet, which must not be rounded within 3 cables' lengths; keep on about E.N.E., till the opening between Pullee and Pulleevausel bears S., then steer E., and anchor near the horse-shoe bank channel, which has a buoy to mark its position. No vessel drawing more than $8\frac{1}{2}$ ft. water, ought to attempt this navigation without a Keelakari pilot.

MANAULI ISLET, lying 7 m. to the S.W. of Paumben Light-house, is the E. of a number of islets, which, with their fringing reefs and intervening banks, lie at some distance off the Madura shore between Tonitorai and Valinukam Points, thus sheltering a considerable extent of the N. waters of the Gulf of Manar from the swell of the S.W. monsoon, and affording convenient smooth water navigation for the coasting craft. The E. extreme of its fringing reef is 2 m. E. of Manauli; and the passage between it and the shoal water on the S. of Pullee, is $\frac{1}{2}$ m. broad; the leading marks through it being Tonitorai Temple, just open to the left of Pullee Islet. A shoal patch, with $2\frac{1}{2}$ fathoms water, lies outside of the reef $2\frac{1}{2}$ m. S. of Manauli Islet; and the S. extreme of the reef encircling Manauli and Moosel Islets bears 3 m. W. from this patch.

Pullee Reef, encircling the three Islets, Pullee, Pullee-vausel, and Coorisuddy, forms a natural break-water to protect the Paumben Pass from the violence of the S.W. monsoon. Pullee, the W. islet, has now a **Beacon**, not far within the W. end of the Reef, bearing E.N.E., and $3\frac{1}{2}$ m. from Manauli Islet. Shoal-patches of 6 and 8 ft. lie about $1\frac{1}{2}$ m. to S. of Pullee Beacon, and nearly connect Pullee Reef with the Shingle Islets. (See also Paumben Pass, further on).

The Shingle Islets are 3 m. to E. of Pullee Beacon, and $1\frac{1}{2}$ m. to S.E. of Coonducam Point (Ramiseram Island); the reef, on which they stand, extends rather more than a cable's length E. of them. There is a shoal patch of 2 fathoms lying 4 m. S. by E. from these islets; to avoid this, attention must be paid to the chart, which will be the best guide, if there be not a pilot on board. When going in by the E. channel, give the Shingle Islets a wide berth of 3 or 4 cables' lengths, to avoid the foul ground off them; a good rule for passing clear is, not to bring the high conspicuous tree to bear to the N. of N.W. by N., till close in with the S. shore of Ramiseram Island; then haul to the W., and pass Coonducam Point within 2 or 3 cables' lengths. A pole has been erected (1846) on the N. limit of the shoal water inside the Shingle Islets, between which and Ramiseram the deepest water is to be found; the S. end of the passage through the horse-shoe bank, by which vessels have to enter, when going through the Paumben Channel, bears from this pole W. by N.

RAMISERAM, or RAMESHWARAM ISLAND, lying between Adam's Bridge and the S.E. cape of Hindostan, is low and sandy, well planted with cocoa-nut trees towards its W. end. In length, nearly E. and W., it measures 14 m.; its E. half is merely a narrow strip of sand, but the breadth of the island, where the great temple stands, is nearly 5 m. It is uncultivated, and principally inhabited by Brahmins and their followers, who are supported by the profits derived from the temples. The village of Thani Kodi, at the E. extreme of the island, bears W. by N. $\frac{1}{2}$ N., $16\frac{1}{2}$ m. from the W. end of Manar Island. **The Great Temple, or Coil**, stands on a piece of rising ground on the N. part of the island, bearing N.W. 10 m. from Thani Kodi, and E. $\frac{1}{2}$ N. 5 m. from Paumben Light-house. Its height is about 120 ft., and, with its majestic towers, its vast and gloomy colonnades, and its walls encrusted with carved work and statuary, this temple

exhibits a grand example of the style of such monuments in Southern India; though inferior in dimensions to those of Seringam, Madura, and Tanjore. Thousands of pilgrims from all parts of India resort here. To the S. of the Great Temple there is a fresh-water lake, about 3 m. in circumference. The town of Ramiseram stands N.E. of the lake, and S.E. of the temple, on the E. sea-face of the island.

Coonducam Point (the S.W. point of Ramiseram Island, between which and the Shingle Islets lies the E. channel to and from Paumben Pass), bears S. $\frac{1}{2}$ E. nearly 2 m. from the light-house. The extreme point is low and sandy, but cocoa-nut plantations commence about a cable from it and extend towards the town of Paumben and to the N.E., where a high conspicuous tree stands about $\frac{1}{2}$ m. from the point. This Point bears E.N.E., and is 2 $\frac{1}{2}$ m. from Pullee Beacon.

PAUMBEN PASS. This most important channel between India and Ceylon, recently so much deepened and improved by blasting and dredging, leads the coasting craft from the Gulf of Manar into Palk Strait, close along the W. end of Ramiseram Island, where the town of Paumben stands. This town is intermediate between the light-house and the W. extreme of the island; its regular inhabitants consist chiefly of boatmen and pilots; and their occupation is in conducting vessels through the Pass, unloading, and lading them. Anchorage-fees and customs are levied by the British Government. The Pass consists of a cutting through sand-stone rock, and a dredging through a horse-shoe sand-bank on the Gulf of Manar side of it; an average depth of 12 or 13 ft. water has now been obtained, and further improvement is expected. The approach to the N. entrance is marked by a buoy, from which the light-house bears about E. by S., and is 7 cables distant. South of the horse-shoe bank, protecting the Pass from the S. swell of the S.W. monsoon, there is a **large coral reef**, on which stands the islets of Pullee, Pulleevausel, and Coorisuddy, all low and sandy, with stunted bushes. Eastward of this reef there lies another, on which stand the Shingle Islets, bearing S.S.E. 3 m. from Paumben Light-house, and 1 $\frac{1}{2}$ m. from the nearest shore of Ramiseram. There are channels round both E. and W. sides of the above reefs, by which small vessels approach the Paumben Pass. For the W. channel, between Manauli and Pullee Islets, the leading marks are, Tonitorai Temple just open to the left of Pullee Island.

Light. A *fixed* light is exhibited to the N.E. of the town of Paumben, and 1 m. E. of the Pass. It is 97 ft. above H. W. mark; but its column, which is circular, is only 56 ft. from base to vane, as it stands on an elevated piece of ground. The light is visible all round the compass, and seen 11 to 12 m. off in clear weather.

Adam's Bridge. This barrier is a narrow ridge of sand and rocks, mostly dry, forming the head of the Gulf of Manar; with the islands of Ramiseram near the Indian side and Manar on the Ceylon side, it nearly connects the latter with the continent. It extends 16 or 17 m. nearly E. and W., and is composed of shifting sand-banks with small intricate channels between them, in which the average depth is 4 ft. at L. W. The edge of the bank of soundings is 12 m. to the S.W. of Adam's Bridge. Small native craft often pass through the channels of the Bridge to escape payments of the *dues* which are charged for the Paumben Pass.

MANAR, or MANAAR ISLAND, is separated from the main land of Ceylon by a very narrow channel, which is said to have 10 or 12 ft. water in some places. It is about 15 m. in length E. and W., and its W. point bears N. 53 m. from the N.W. point of Calpentyn Island. The town of Manar is at the E. end of the island, amongst cocoa-nut trees, and has an old fort. Manar was anciently the seat of the pearl-fishery; but, at the present day, its importance has greatly declined. During the early ages, a considerable portion of the trade, between the E. and W. coasts of India, was carried on through the narrow channel which separates Manar from Ceylon, and active establishments were formed, not only at Mantotte on the main land, but in the little island itself, to be used for unloading and reloading such craft as it was necessary to lighten in order to assist them over the shoals. The fort at Manar, in lat. 8° 59' N., lon. 79° 53' E., built by the Portuguese, and strengthened by the Dutch, is still in tolerable repair; the village has plenty of cocoa-nut trees, and presents an aspect of industry and comfort. But the country beyond is sterile, covered only by stunted trees. The most singular objects in the landscape are a number of the monstrous Baobab trees, whose importation, from the W. coast of Africa to India and Ceylon, is a mystery as yet unsolved: one of the largest, at Manar, measured upwards of 30 ft. in circumference, although it was a very little more in height. The sea-face of the centre of the island has low sand-hills for about 5 m.; the W. end has abundance of cocoa and other palm trees by the villages. The barren sand-drifts of this island are adapted to the growth of the palmyra and cocoa-nut palm, though incapable of producing sufficient grain for its inhabitants. The bank of soundings extends 17 m. to the S.W. of Manar Island.

Aripo River, or Arive-ar, falls into the sea by three or four mouths to the N. of the village of Aripo. This most prominent point of its little delta bears N.N.W. $\frac{1}{2}$ W. 7 $\frac{1}{2}$ m. from Condachi

Village, and the coast runs on in a nearly N. direction for a like distance to the little islets and creeks that separate the island of Manar from the main land. The extensive bay, formed between the mouths of the Arive-ar and the W. end of Manar Island, is very shallow, and doubtless gradually becoming more so. The anchorage at Manar was (half a century ago) on the S. side of the island, in 4 or 5 fathoms, about 4 m. to the W. of the gut which separates the island from the opposite point of Mantotte; but now that depth of water will not be found within 6 m. of the gut.

Condachi, is a sea-coast village, at the bottom of a bight, mid-way between Moderegam Point and the Aripo River mouth, bearing from the former N. by E. $\frac{1}{4}$ E. at a distance of 8 m. The Kalar River is 3 m. S. of Condachi, and the sandy shore, between it and the Arive-ar or Aripo River, is, during a pearl-fishing season, the resort of thousands of people who are engaged in the trade. Enormous mounds of shells raise this shore to a height of several feet; these are the accumulation of ages, the millions of oysters having been, year after year, flung into heaps that extend for many miles along this shore.

The Pearl Banks are on the outlying shoals that extend many miles W. of the shore between Condachi and Manar Island. On approaching this oyster-fishers' resort from sea-ward, the first land-mark seen is a building, erected as a temporary residence for the Governor of Ceylon, and known by the name of Doric, from the style of its architecture. A few cocoa-nut palms appear next above the low sandy beach, and presently are discerned the scattered houses which form the villages of Aripo and Condachi, 5 m. apart. During the progress of a fishery, this dreary expanse becomes suddenly enlivened by the crowds who congregate from distant parts of India, by whose skill there suddenly springs up a town of temporary dwellings, huts of timber and palm-leaves, with tents.

KODRA-MALAI POINT, in lat. $8^{\circ} 32' N.$, lon. $79^{\circ} 52' E.$, is on the main land, about 27 m. to the S. of Manar Fort, bearing E. by N., $4\frac{1}{4}$ m. from the N. end of Kara-tivo, and 30 m. to the N. of Putlam, the intermediate shore taking a tolerably straight direction of N. $\frac{1}{4}$ E. The point is steep and rocky on its N. side, and may be known by the three long hills seen over the low land of Kara-tivo. From Kodra-malai the coast runs N.E. for 4 m. to Moderegam Point, forming a bay between them; and thence more to N. towards Condachi.

Anchorage. Very good anchorage, in the S.W. monsoon, may be found under the lee of Kodra-malai Point. Steer for it with the N. end of the hills bearing E. by S. till the vessel is well past Kara-tivo Island; then, altering course as requisite for rounding-to, the anchor may be let go in $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms, sandy bottom, with the rocky promontory bearing between S.S.W. and S.W. at a distance of from $\frac{1}{2}$ m. to $1\frac{1}{2}$ m. No vessel ought to proceed on the Ceylon side further towards the head of the Gulf of Manar than this place, as there are many shoal places at some distance from the shore, and no good holding-ground. In the S.W. monsoon, a strong current is found setting N. over Adam's Bridge, which abates as the Indian coast is approached; a confused sea is generally found to prevail near Manar.

KARA-TIVO, or CARDIVA ISLAND, (the N. extreme), in lat. $8^{\circ} 31' N.$, lon. $79^{\circ} 47' E.$, bears N. by E. $\frac{1}{4}$ E. 19 m. from the N.W. point of Calpenty Island. Kara-tivo is a long narrow strip, extending N. and S. nearly 12 m., nearly parallel with the Ceylon shore, from which it is distant on the S. $1\frac{1}{2}$ m., on the N. about 4 m., and a channel for coasting craft exists between them. Kara-tivo is low, with sandy hillocks in some parts, and bushes or trees in others; that part which lies N.N.E. of Dutch Bay has some palmyra trees, a few of which are leafless, and these form a good mark for the outer sandy shoal patch, mentioned as lying to the N. of the entrance to Dutch Bay. On the main land, behind Kara-tivo, there are ridges of hills moderately elevated, which, being seen in clear weather at a distance of 7 m. off shore, have the appearance of being on the island. The edge of the bank of soundings is 6 or 7 m. off the sea-face of Kara-tivo; a vessel should not shoal under 7 fathoms water, as several small rocky banks lie from 2 to 4 m. off the land; to the N. of the island, shoal patches, with 9 fathoms water, extend 6 m. off. The S.W.-most of the Aripo Shoals lie 15 m. to the N.N.W. of Kara-tivo Island, but that part of the Gulf of Manar is unfortunately not sounded, being exhibited as a blank space in the latest charts.

Dutch Bay. This is a snug little cove, formed by the two N. forking points of Long Island, which lies to N. of Calpenty Island, and, from sea-ward, seems to form a part of it, thus extending the island to all appearance 3 m. to N. This bay is opposite the S. end of Kara-tivo Island, but the water between them is shallow; it affords shelter from all winds, but more particularly from the S.W., which are the strongest. **Anchorage.** Vessels can anchor in $2\frac{1}{2}$ to 3 fathoms, stiff mud, close inside the neck of sand that forms the W. side of the bay, with a house in a cocoa-nut tope, called Paringe-torai, bearing S.S.W. The only dangers in the approach to it are a rocky patch with $2\frac{1}{2}$ fathoms over it at L. W., lying 2 m. W.S.W. of the N. end of the neck of sand, just mentioned; and some shoal water bearing N.N.W. 3 m. from that neck, and $2\frac{1}{2}$ m. due W. from

the palmyra trees on the island of Kara-tivo. This last shoal water extends N. and S. about 2 m., with an average breadth of 1 m., and has over it from 3 ft. to 3 fathoms, with a small patch of sand, generally dry, bearing due W. of the above trees. To the E. of this reef, between it and Kara-tivo, there is a passage with a depth of 4 to 5 fathoms; but no person, without being well acquainted with the coast, ought to attempt this.

Bring the neck of sand of Dutch Bay to bear S.E. by E., when it can be steered for and passed within 50 yards, carrying 3 to 4 fathoms, sand.

CALPENTYN ISLAND. This island is upwards of 40 m. in length parallel to the Ceylon shore; its S. extreme forms the N. side of the Dedru-oya River mouth; when viewed from the offing, the island appears as part of the main land. Talavilly, the N.W. point of the island, is in lat. $8^{\circ} 12' N.$, lon. $79^{\circ} 41' E.$ The town and fort of Calpentyne are $1\frac{1}{2}$ m. from the N. extreme of the island, on its land-ward side; boats have access to the town from sea by a narrow passage, called the Gut (separating Long Island from Calpentyne), as well as by the broad channel to the N. of Long Island, between Dutch Bay and Kara-tivo.

The Coast from Chilaw Point towards the N. belongs to Calpentyne Island, which is low and sandy, on a coral foundation, a long sweep of desolate shore; having a general direction of N. by W. for 32 m. to the W. projection of the island, then N. for 5 m. to its N.W. point; trees exist only by the villages, and these are few and far between, as the Putlam Lake and the back-water S. of it so completely cut off Calpentyne Island from speedy communication with the main land of Ceylon. Putlam is a large town with a fort near the S.E. corner of the lake, 6 m. away from the sea, but the strip of Calpentyne Island opposite the town is only $\frac{1}{2}$ m. broad. The S. extreme of Putlam Lake is well defined by the 8th parallel of latitude. Off this part of the coast, about half-way between Chilaw and Calpentyne Towns, and some 3 or 4 m. off the sea-face of the island, there are uneven soundings on rock with so little a depth as $3\frac{1}{2}$ fathoms, and 6 to 8 fathoms immediately outside. Vessels of size ought therefore to be careful not to come within 5 m. of land hereabouts, or expect to get soundings, as these shoal spots are not 2 m. from the edge of the bank of soundings; small craft, however, can at all times go over these shoals.

CHILAW TOWN, in lat. $7^{\circ} 34' N.$, lon. $79^{\circ} 47' E.$, which is 22 m. due N. of Negomba Point, stands on the E. bank of an estuary that runs parallel and very near to the coast, having a common mouth with the Dedru-oya River at Chilaw Point, about 2 m. N. of this town. There is a bungalow on the shore abreast of the town, conspicuous by its red-tiled roof, and seen 8 or 9 m. from a ship's deck in clear weather. Chilaw Point is 2 m. to the N. of the bungalow, and may be known by a sand-hill, having on it some bushes, and near it there is a round hummock.

Anchorage. The common mouth, of the Chilaw Estuary and of the Dedru-oya River, is close to the N. of the point, and vessels may anchor abreast this river mouth with it bearing S.E., in $5\frac{1}{2}$ or 6 fathoms, mud, about $\frac{3}{4}$ m. off shore. In coming to Chilaw from the N., a vessel should keep out of soundings, some 2 m. off the out-lying banks along the shore of Calpentyne, till half-way between these two places, when she may haul in towards the shore. There are some rocks 5 m. due N. of Chilaw Bungalow, but as they are not more than $\frac{3}{4}$ m. off shore, they do not form an obstacle to the general navigation of the coast; they are partly above water, and lie in the line of 4 fathoms. In approaching Chilaw River from the S., a vessel may stand close along shore in the anchoring depth till abreast of the river; rocks fringe this sandy shore from the point to a distance of 3 m. S. of the bungalow.

Kemel River entrance is 4 m. N. of Negomba, and causes a break in the line of cocoa-nut trees which fringe this sandy coast. At Ooluwitti, a village $3\frac{1}{2}$ m. N. of Kemel, the coast is a little projecting, but the bottom out to 5 fathoms is mud, and the shore safe to approach. Onwards to Chilaw there is the same straight sandy coast with tops of trees about the villages.

NEGOMBA POINT, in lat. $7^{\circ} 12' N.$, lon. $79^{\circ} 48' E.$, is nearly a mile W. of the large town of that name, and bears N. $\frac{1}{2}$ W. 16 m. from Colombo Light-house. Canal communication exists between these places, opening out into Negomba Lake, which is upwards of 5 m. in length by 2 in breadth, and at the rainy seasons discharges a great body of water, that runs to the N. through an opening between the fort and the point. Negomba has a considerable trade, and may be known by the prominent point, which is covered with cocoa-nut trees; off it a ledge of rocks awash extends N. by W. $\frac{1}{2}$ W., for 2 cables' lengths, and this may be traced in the same direction with depths of 3, 4, and 5 fathoms over it for $2\frac{1}{2}$ m. farther, till it terminates in a coral patch, having 9 and 12 ft. water, at a distance of 3 m. from Negomba Point, and $2\frac{1}{2}$ m. W.S.W. of Kemel River entrance.

Soundings near shore are more regular than further S.; shoal water extends a greater distance off shore, but, the bottom being almost all mud within a line drawn from Colombo Fort to Negomba Point (except the rocks at the mouth of the Kalani-ganga), a vessel can stand in to 7 fathoms by day in fine weather.

Anchorage. Small craft can cross the above ledge, and anchor in 2 or 3 fathoms, with Negomba Point S.W. $\frac{1}{4}$ W., and the fort S.E. by E. at the distance of 3 or 4 cables from the sandy shore. For large vessels, the best anchorage is 1 m. off the rocky point, with the fort bearing E. a little N., in $6\frac{1}{2}$ to 7 fathoms, sand; but, as this sand is not deep, and the stream of the Negomba Lake sets to the N., vessels are warned against anchoring here during the S.W. monsoon, or from May to August inclusive.

COLOMBO. The flag-staff, close to the light-house, in lat. $6^{\circ} 56' N.$, lon. $79^{\circ} 50' E.$, bears S. $\frac{1}{4}$ E. 16 m. from Negomba Point, and N. by W. from Mount Lavinia, distant $6\frac{1}{2}$ m. The coast about Colombo is low, and not visible from sea-ward more than 10 m. About 1 m. N. of the fort near Mutwal there are some lofty fir trees, which are generally seen when approaching from sea-ward before the light-house or flag-staff. They afford a good land-mark for Colombo, as, when viewed from sea-ward, they appear considerably elevated above the surrounding cocoa-nut trees, and seem as one *tope* rather thinly planted. No other part of the coast, either N. or S. of Colombo, affords a similar mark to this. The Dutch church, a large building in the bottom of the bay (to the N.E. of the fort), the upper part of which has a thatched belfry, and may be seen over the houses of the town, forms a good mark as a cross bearing for vessels coming to an anchor in the roads. There are some isolated hills at a distance in the country, and the high mountain having on it a sharp cone called Adam's Peak, 7,420 ft. above the level of the sea, has been seen in clear weather at a distance of 30 leagues. In the N.E. monsoon it is generally visible in the morning, and sometimes throughout the day, but it is rarely seen in the S.W. monsoon, through the humid atmosphere which prevails in that season.

Sunken Rocks. The first danger in approaching the roadstead from the S. is the Drunken Sailor, a ledge of rocks with only 6 ft. water over the shallowest part, which bears W. by S. $\frac{1}{4}$ S. from the light tower, and is distant off shore about $\frac{1}{2}$ m. This danger during the S.W. monsoon has a constant break of the sea; but not during the N.E. monsoon, with smooth water, and it will then be prudent not to come under 10 fathoms, water, when in the vicinity of these rocks, as there are 8 fathoms close outside them, until the Custom-house Point bears to S. of E.S.E.; then stand in for the shipping, as no advantage can be gained by steering close to these rocks at any time. A black buoy is placed, during the N.E. monsoon, from Oct. 15th to April 15th, close on the W. side of Drunken Sailor.

Another Sunken Rock, with 20 ft. water over it, has been discovered in the approach from the W. It lies about $\frac{1}{2}$ m. to N. of Drunken Sailor, and bears W. by N. from the Custom-house Point, and N.W. from the flag-staff. A red buoy is placed a few yards to the W. of it, to which all vessels must give a clear berth of half a cable's length.

A ledge of rocks stretches along shore to the N. from Mutwal; but as this ledge is only about $\frac{1}{2}$ m. off shore, and out of the usual track of shipping, it is scarcely worthy of note as a danger.

PORT of COLOMBO. The roadstead of Colombo, although exposed to the S.W. monsoon, is a safe one for vessels well found in ground tackle. Vessels generally ride out the monsoon at single anchor, with a long scope of chain. A gale of wind may occur about the changes of the monsoon, in the months of May, June, Nov., and even as late as Dec.; though a gale in the latter month is very rare, and several years sometimes pass away without any beyond a stiff monsoon breeze. These gales are seldom violent, and it is only during them that casualties occur to the shipping. Only five vessels have been wrecked within the last thirty-two years. Communication between the shore and shipping is seldom interrupted, although there are occasional spells of squally weather and a high sea during the S.W. monsoon, which make the passage over the bar difficult and dangerous, especially for small boats.*

The Inner Road, or Harbour, is mostly occupied by the native coasting vessels. It is considerably sheltered from the S.W. monsoon by the N. bastion of the fort and bar, and affords good and safe anchorage for vessels drawing not over 11 ft. The bar is a shifting sand-bank, extending for about $1\frac{1}{4}$ cables' lengths from the N. bastion, in a direction towards Mutwal Point; there are 7 to 12 ft. water on it, and $3\frac{1}{2}$ fathoms inside and beyond it. Strangers should not enter the Inner Road without a pilot; and as the sea sometimes breaks on the bar during the S.W. monsoon, and several lives have been lost by boats being swamped, they should not use their own boats in landing, but employ one of the outrigger canoes, which are always available, until they become acquainted with the passage over it. Colombo abounds with good water, and other refreshments. The exports to Europe are cardamoms, cinnamon, coffee, cocoa-nut oil, coir cordage, ebony, pepper, plumbago and satin-wood; and the trade is increasing every year.

Tides and Current. The current off Colombo and in the Gulf of Manar, is subject to

* A break-water is proposed for Colombo, and wharves and docks.

considerable variation, particularly about the changes of monsoon, when it is strongest, but generally speaking it sets with the monsoon, and is never so strong as to inconvenience vessels making Colombo. The greatest difference between high and low water recorded at Colombo is not more than 2 ft. 10 in. In the S.W. monsoon, when the mean level of the ocean is the lowest, the difference between high and low water is from 5 to 15 in. On those days when the difference between high and low water is not more than 6 in., the rise and fall has been observed to take place four times within twenty-four hours.

Light. A *fixed white* light, in lat. $6^{\circ} 56' N.$, lon. $79^{\circ} 50' E.$, is exhibited every night from the clock tower, a circular wooden building, standing in the centre of the fort. The light is elevated 133 ft. above sea-level, and visible in clear weather from a ship's poop 18 to 20 m.

Anchorage. A vessel may anchor anywhere in the outer roads, with the flag-staff bearing from S. $\frac{1}{2}$ E. to S.E. by E., in $6\frac{1}{2}$ to $9\frac{1}{2}$ fathoms, water, and distant from the N. bastion of the fort from $\frac{1}{2}$ to 1 m. The best anchorage is with the flag-staff bearing about S.S.E. $\frac{1}{2}$ E., and the Dutch church E. by S., in 8 fathoms, water. Vessels arriving during the S.W. monsoon, or about the changes of the monsoon, should not anchor nearer the N. bastion than $\frac{1}{2}$ m., or bring the rocky point at Mutwal (which is about $1\frac{1}{2}$ m. N. of the fort) to bear N. of N.E. $\frac{1}{2}$ E.; and they are recommended to ride with not less than 80 fathoms cable to the hawse, and to have all the shackles looked to and the small pins well secured before coming to an anchor. The constant pitching motion to which vessels are subjected, causes the cables at some distance from the hawse to beat and chafe on the ground, and the shackle pins frequently work out if not well secured. The small pins should be of iron, with large heads, and the other ends well clinched over a ring; if not clinched they invariably loosen, and work out.

The Ballast Ground during the S.W. monsoon is in 15 fathoms water, with the flag-staff bearing about E.; and during the N.E. monsoon in the same depth of water, with the flag-staff about E.S.E., where vessels may discharge their ballast overboard.

DIRECTIONS. Vessels bound to Colombo during the S.W. monsoon from S. of the equator, should not cross it to the E. of lon. $77^{\circ} E.$ Between lat. $3^{\circ} N.$ and the coast of Ceylon, a strong current (sometimes 50 m. a day) sets to the E., and the wind frequently hangs from W. until the Gulf of Manar is entered, thus making it difficult to fetch the port, if not well to windward. The coast for 30 m. S. of Colombo may be approached with safety to a distance of 2 m.

A steep bank of coral lies in a very narrow strip, parallel to the line of coast, about 8 m. off Colombo, extending a few miles S. where it is deepest, having 18 and 20 fathoms, with 25 fathoms inshore of that, and extending to the N. till nearly abreast of Negomba, where it is shoalest, having 11 or 12 fathoms, with 18 or 19 fathoms inside. With Colombo bearing S.E. by E., distant 12 m., the bank has 15 fathoms, outside of that it deepens at once to 23, and, at 2 m. from it there are 28 fathoms, greenish sand. Within the bank there are 25 fathoms opposite Colombo, gradually shoaling towards the shore. The extreme verge of the bank of soundings is only 3 or 4 m. outside this bank.

The Coast. To the N. of Colombo, in the cinnamon garden of Kadarani, standing 5 m. apart, are two towers, each 100 ft. high, which mark the ends of a base-line, measured in 1845, from which the trigonometrical survey of the Island of Ceylon commenced; these towers are some little distance from the sea-shore, but, being not much higher than the cocoa-nut trees of the coast, are not discernible from sea-ward. The shore-line, from the mouth of the Kalani-ganga to Negomba, runs tolerably straight for 14 m., low and sandy, and fringed with cocoa-nut trees.

WINDS and WEATHER at COLOMBO. Jan.—At the opening of the year the N.E. monsoon is at its height: its general effects are parching and disagreeable by day, cold, dry, and cutting at night, when, as the *along-shore wind*, it is avoided as injurious to health, and every window is shut against it. Towards the close of the month the wind gets a little W. tendency, and occasional showers fall. Feb. is dry and hot by day, but the nights are cloudless and cool. The wind is unsteady, and shifts from N.E. to N.W., sometimes failing entirely between noon and night. Rain is rare; only 2 in. fall during the whole month. In March the heat continues to increase. The winds are faint and unsteady, with increasing W. tendency; partial showers sometimes fall, and thunder begins to be heard at sunset from the stacked-up clouds amongst the hills; this month has the same amount of rain as the preceding. April is the most oppressive portion of the year, the mean temperature by day being about 88° . The wind veers between N.W. and S.W. Towards the end of the month a ground swell from the W. proclaims that the S.W. monsoon is not far distant, and the sea-breeze towards sunset brings clouds and showers.

S.W. Monsoon. May in the commencement is hotter than the last, and the days become more overcast; banks of clouds rise over the ocean and give warning of the approaching monsoon. At last, about the middle of the month, sudden lightnings flash among the hills, and with awful

crashes of thunder the S.W. monsoon bursts over the thirsty land in a deluge, that, in the course of a few hours, overflows river banks and inundates the plains. Fortunately this violence seldom lasts more than one or two hours, and gradually abates, when a clear sky supervenes; then for some days heavy showers continue to fall at intervals in the forenoon; and the evening sun goes down in great splendour, the wind remaining steadily in the S.W. quarter. In May the greatest monthly rain-fall occurs, viz., from 13 to 14 in.

In June the S.W. wind gains considerable strength; indeed, this is the most dangerous month for shipping in Colombo Roads, on account of the heavy swell that rolls in, though few accidents are said to occur. The fishermen seldom put to sea in this month. The temperature is much reduced by the refreshing influence of the monsoon, the heat being modified by transient clouds and frequent showers; the rain-fall, however, is only a little more than half that of May. July (though more boisterous than June near Bombay) is more moderate on the W. coast of Ceylon, and showers are less frequent, the amount of rain being only half that of June, and one-fourth that of the month in which the monsoon is ushered in. Aug. and Sept. are beautiful months, with light W. breezes, which, towards the close of the latter, begin to get unsteady and to assume a little Northing, and clouds begin to collect. The nights are always clear and cool. Sept. has twice as much rain as Aug., but not quite so much as June. Oct. has more unsettled weather, but the sea is smooth, and the wind is not strong, though it veers more to the N. There is twice as much rain as in the previous month.

N.E. Monsoon. In the early part of Nov. the wind veers between N.N.E. at night and N.W. by day: about the middle of the month the W. monsoon is completely over, and the N.E. monsoon is ushered in by lightning, thunder, and heavy rain, though the atmospheric disturbance is not so great as that of May. The rain-fall of Nov. is nearly 11 in., which is $\frac{1}{4}$ in. less than is registered in the month of Oct. In Dec. the N.E. monsoon is steady and of moderate strength, bringing with it light but frequent rains, the total quantity of which, however, does not amount to half that of Nov. In this last month of the year, as in the first, the along-shore land-wind is dry and cutting, and at night very injurious to those who are so incautious as to sleep in it.

The rain-fall in the year at Colombo averages 72 in., about nine-tenths of the quantity that is gauged at Bombay Harbour; but that of the Malabar coast, intermediate between those places, is much greater. The rain of Ceylon is more equally distributed than that of India throughout the months of the year, but there are two periods of heaviest rain, the autumnal one corresponding with the Madras monsoon, and the other period, between spring and summer, corresponding with the Bombay monsoon, or rather anticipating it by one month. Of course the W. coast of the island presents a contrast with the E., for, while the former is drenched, the low country E. of the mountain region is sometimes exhausted with dryness, but receives its rain subsequently from the N.E. monsoon; in amount, about as much as the Madras coast, or about two-thirds of that which Colombo receives. But in the extreme N. of the island, the total in the year does not exceed 30 in.

PANTURA. This large town, in lat. $6^{\circ} 42' N.$, lon $79^{\circ} 54' E.$, 14 m. to S. by E. of Colombo, and bearing N.N.W. 8 m. from Caltura Fort, is at the mouth of a river which flows from Pantura Lake. On the S. side of the entrance are two rocks above water, surrounded by others under water; the outer one stands nearly a mile W.S.W. of the town, and has a depth of 8 fathoms close outside. The anchorage is to S. of these rocks in 10 or 12 fathoms, nearly 2 m. off shore. A high tree stands behind the cocoa-nuts, $2\frac{1}{2}$ m. N. of Pantura, nearly a mile from the beach. About 2 m. N.N.W. of this tree, there is a rocky bank of 3 fathoms, about a mile in length, lying parallel with the shore-line and $\frac{1}{4}$ m. off, opposite the village of Digorella. **Mount Lavinia**, a rocky headland, the most prominent point between Barbelyn and Colombo, bears N.N.W. $7\frac{1}{2}$ m. from Pantura. On it are the remains of what was once the marine palace of the Governors of Ceylon. A narrow rocky bank, with 1 fathom water, lies along-shore S. of the mount, and extending more than half-way to the Digorella Bank. Off Pantura and Caltura, soundings of 10 fathoms are not found within 2 m. of land; but abreast of Mount Lavinia that depth is less than $\frac{1}{4}$ m. off, and W. of Colombo Fort a full mile off. To the S. of Colombo, along the shore, lies the suburb of Colpetty, with its numerous villas. A considerable space is left clear of houses on the S. of the fort; this is called the Galle-face.

CALTURA FORT, in lat. $6^{\circ} 35' N.$, lon. $79^{\circ} 57' E.$, on the E. bank of the Kalu Ganga river, and about $\frac{3}{4}$ m. N. by E. of its entrance, bears from Barbelyn Island N. $\frac{1}{4}$ W., $7\frac{1}{2}$ m. The land, on which the Fort stands, is a little elevated, and about $\frac{1}{2}$ m. within the average line of the sandy shore which extends from Caltura two-thirds of the way to Barbelyn, to Magoona Point, $1\frac{1}{2}$ m. to the S.W. of Beach Hill; nearly a mile off this last-named point stands a rock, called Nawoellekande, and a **sunken rock** lies $\frac{1}{2}$ m. to the S. of that. Ships should not come under 10 or 12 fathoms, off Caltura, on account of foul ground both to the N. and S., except they intend to ancho,

in the roadstead. Steer in for the Fort about E., keeping it between two of the Hummocks at the S. end of some high land (25 m. E. of the sea); the N.-most Hummock or Knuckle is the lowest. With these marks on, a ship may run in and anchor in $5\frac{1}{2}$ or 6 fathoms water, tolerable ground, but it is rocky out in 15 or 16 fathoms. When approaching Caltura from the S., ships may steer for the Fort when it comes on with Adam's Peak, thus giving the 2-fathom rock a wide berth of 1 m.

Two-fathom Rock. This is the principal danger off Caltura, lying a good mile off shore, and on the bearing of S.W. $\frac{1}{2}$ S. from the Fort, a distance of $1\frac{1}{2}$ m.; it has a depth of 12 or 13 ft. on it, and does not break, except in such bad weather as would forbid a ship's communicating with Caltura. The Rock is in the line of 6 fathoms, so that small vessels may pass between it and the shore in 4 fathoms, but large ships should not shoal under 10 fathoms. Another rocky patch, with 3 fathoms water, lies S E. by E. $\frac{1}{2}$ E., a short 2 m. from the Two-fathom Rock, and is $1\frac{1}{2}$ m. to the N. of Nawoelle-kande high rock, off Beach Hill.

The Coast N. of Caltura to Pantura is low and sandy, abundantly planted with cocoa-nut trees. There is canal communication between these places and Negombo. Inland, some 25 m. E. from Caltura, is a range of hills, the two S. Hummocks of which, known also as the Knuckles, are useful land-marks in clear weather for this part of the coast. **Desaster Rock**, off a village of that name, stands close to the shore, about $1\frac{1}{2}$ m. to N.W. of Caltura Fort; there are sunken rocks both to N. and S. of it, and a ship has no business under 10 fathoms.

BARBERYN ISLAND. This little island, in lat. $6^{\circ} 28' N.$, lon. $79^{\circ} 57' E.$, standing about 2 cables off the main land, to which rocks connect it, forms a prominent point of the coast, bearing from the Myimba Rocks off Cocacheira Point, about N. by W. $\frac{1}{2}$ W., a distance of $12\frac{1}{2}$ m. It is 3 m. N.W. by N. of Bentotte River, and most of the intermediate coast is rocky. This island, being small and so close to the shore, is not easily perceived, except when near; there is anchorage to the N. of it in 6 or 7 fathoms, and a small bay farther in, with 2 or 3 fathoms, sandy bottom, where small craft may anchor. The latest chart does not exhibit any rocks projecting from the N.W. end of the island, such as formerly described, but it will be prudent not to shoal under 14 fathoms when passing the place.

Bentotte River entrance is $\frac{1}{2}$ m. to the N. of Oodapitta Point; the town of Bentotte is on the S. bank, and $\frac{1}{2}$ m. from the bar, on which there are only 3 or 4 ft. water, but this depth varies according to the season, being much greater after heavy rains when the bar becomes navigable for the native coasting craft. Inside the river, there is a depth of 1 and 2 fathoms. As the sands on the bar frequently shift, and there is generally a surf, boats should not attempt to cross it without a pilot.

OODAPITTA POINT, in lat. $6^{\circ} 25' N.$, lon. $79^{\circ} 59' E.$, at 3 m. to S. of Barberyn, and bearing N. by W. $\frac{1}{2}$ W., 3 m. from Unapaya-galle, is rocky and of moderate height, having several rocks above water lying off it. The Anderan Rocks are two rocky islets lying off this point, bearing W N.W., $\frac{1}{2}$ m. from it; there is a depth of 6 and 7 fathoms close outside of them, and 4 or 5 fathoms inside, between them and the sandy point which dries off Modere-galle (the rocky point that forms the S. side of Bentotte River, and is in reality the N. extreme of Oodapitta Point); but no vessel should pass between Anderan Rocks and the point, for there are several rocks having only 3 or 4 ft. water.

Unapayagalle Point, bearing N. by W. $\frac{1}{2}$ W., $3\frac{1}{2}$ m. from Ahungalle Point, is low and rocky, and continues so for $\frac{1}{2}$ m. in a S. direction to Nyakandugalle Point, but between this last and Kosgodde Hill the shore is sand. Kerevanne Rock, a small white-topped rock, stands $\frac{1}{2}$ m. S.W. of the point; and 1 m. W. of this rock, is the N. extreme of Outaree, a rocky bank having a depth of 4 fathoms, extending S. till within $\frac{1}{2}$ m. sea-ward of Napa Rock. **Dodompara Rocks** stand above water at $\frac{1}{2}$ m. to N.W. of the above point, and $\frac{1}{2}$ m. off the nearest shore, abreast of a little hill called Galbode-Kande, which is $\frac{1}{2}$ m. from the beach; and, between these rocks and Oodapitta Point lie several others with from 3 to 6 ft. water on them, and from $\frac{1}{2}$ to $\frac{3}{4}$ m. off shore; outside these rocks there are 5 and 6 fathoms water, sandy bottom, with occasional patches of coral.

Napa Rock, lying $1\frac{1}{2}$ m. due N. of Alut Rock, and 1 m. off shore, has 2 fathoms water on it, and 8 fathoms close outside; it forms the N. extreme of the Conda Bank, which extends to the S. till $\frac{1}{2}$ m. in-shore of Alut Rock. There is a bank, having 30 and 32 fathoms water, with 37 and 38 fathoms inside, between it and the land. From it the Haycock Mountain (bearing about E. and 16 m. inland of Kosgodde Hill), bore about E.; the distance from shore was about 15 m., and it extended a considerable distance to the S. The latest charts exhibit a similar bank, some 20 m. in length N. and S., lying parallel to the shore and 9 or 10 m. off, between Barberyn Island and Akorale Point; and it probably extends still farther S., as there are indications of it 13 m. due W. from Point de Galle.

ALUT ROCK. This rock, in lat. $6^{\circ} 19' N.$, lon. $80^{\circ} 0' E.$, having only 8 ft. water on it, and

deep water all round, lies $1\frac{1}{2}$ m. W. from Ahungalle Point. When on the rock, the Haycock Hill is in one with the house on the cliffs near Ahungalle Point. To pass outside of Alut Rock, Gindavana Islet must be kept open of Myimba Rocks, and no vessel should shoal under 12 fathoms by day, or 17 fathoms by night.

Ahungalle Point, bearing N., 2 m. from Muta Amarata Boka, is low and rocky, the S. extreme of some rocky cliffs $\frac{1}{2}$ m. in length; the N. end is of considerable height, and called Kosgodde Hill; on the summit of the cliffs near Ahungalle Point stands a house conspicuous from sea-ward. Harispol Point, standing mid-way between Ahungalle and Balpitti River, is low and sandy, but has several high rocky islets lying close off it; between it and the river mouth, there are several rocks above water, surrounded by a reef, between which and the shore there is anchorage off the bar of the river in 2 fathoms, sandy bottom; the passage is between this reef and Ballapitti Modere Point. Several rocks having only from 2 to 6 ft. water over them, lie off this part of the coast, from $\frac{1}{2}$ m. to $\frac{3}{4}$ m. off shore.

Muta Amarata Boka Point (the Cocacheira Point of Captain Horsburgh), bearing N.N.W. and $5\frac{1}{2}$ m. from Akorale Point, is rocky and of moderate height. **Myimba Rocks**, two rocks elevated a few feet above water, stand $\frac{1}{2}$ m. W. of the point; and, close to the N. of it, is the entrance of Ballapitti Modere, a river which is small and navigable for very small boats only. A custom-house stands on the N. side of the entrance, where the shore is low and sandy, and not so prominent as the S. side, called Ballapitti Modere Point, which is rocky and slightly elevated.

GINDAVANA ISLET, in lat. $6^{\circ} 14' N.$, rocky, and of moderate height, stands at the distance of 2 or 3 cables from the shore, bearing N.N.W. from Akorale Point rather less than 3 m. Amblangodde Rest-house, a conspicuous building from sea-ward, stands on the summit of a rocky cliff, $\frac{1}{2}$ m. S.E. by E. from Gindavana; close to the S. of the Rest-house, there is an opening in the rocks forming a cove, with a sandy beach about 100 yards in extent, and anchorage in $2\frac{1}{2}$ fathoms water; a small river has its mouth to the S. of Amblangodde, and off it are several rocks, amongst others are two called Hiria and Tal Gaha. Off Patiagalle Point which is $\frac{3}{4}$ m. S.E. by S. of Gindavana Islet, there is another rock called Radul. White coral is found in such quantities on this part of the coast, that an active trade exists in shipping it to Colombo and Point de Galle, where, when calcined, it serves as the only species of lime used for buildings of all kinds.

The village of Amblam is $1\frac{1}{2}$ m. to the N. of Gindavana, and off it, nearly 1 m. from the shore, lies Wathu or Balu Bank, having 3 fathoms water; this seems to be connected with the bank on which stand the Myimba Rocks.

Akorale Point, called also Webille, bears N.W. by N., $2\frac{1}{2}$ m. from Senegamme Point; it is low and sandy, covered with cocoa-nut trees. Off the Point lies the Tung Rock, and $\frac{1}{2}$ m. N.W. of this, the Vatang Rock; several shoal spots extend more than 1 m. off shore, with from 6 to 9 fathoms water betwixt them. **Passee Rock**, the outermost of the above dangers off Akorale Point, is a small rock above water, with a bank extending from it about 2 cables to the S., on which the sea breaks heavily; this rock bears W. from Akorale Point a large mile; there is a passage between it and the shore, but a ship should always pass outside, as another rock is said to lie 3 or 4 cables N. of Passee.

WAAL ISLET, in lat. $6^{\circ} 8' N.$, lon. $80^{\circ} 5' E.$, is situated 3 cables' lengths off Waal Point, and bears N.W. from Manda Islet rather more than 2 m.; this is a high rocky islet, surrounded by smaller ones. Waal Point (Ragamma Point of Horsburgh), is low, and covered with cocoa-nut trees. Hiccode Rock lies $1\frac{1}{2}$ m. S.S.E. of Waal Islet.

Debaha Rock stands about $\frac{1}{2}$ m. to S.W. of Senegamme low rocky point, and bears from Waal Islet N.N.W. $\frac{1}{2}$ W., $1\frac{1}{2}$ m. This rock is elevated a few feet above the water, and has the appearance of being split into two, or as if one part had fallen from the other. Mid-way between Senegamme Point and Waal Point are the creek and village of Hickadowe, with a traveller's rest-house, which, being hidden by cocoa-nut trees, cannot be distinguished from sea-ward; a gap in the reef, which fringes the coast, affords a passage for small boats and anchorage off the town.

Hiccode Rock. This outlying rock, the outermost danger in Dodandowe Bay, lies $1\frac{1}{2}$ m. W. by N. $\frac{1}{2}$ N. from Medda Islet, and 1 m. from the nearest sandy shore; it is small, having 6 ft. water over it, 7 fathoms near it all round, and 15 fathoms a cable's length to sea-ward. Half a mile in shore of it, there are some rocks, called the Oon Reef, between which and Hiccode Rock there is a passage for vessels, but they had better keep outside of all these dangers. To clear outside of Hiccode Rock, Debaha Rock must be kept well open of Waal Islet. In passing along this part of the coast, do not come under 20 fathoms, the soundings being very irregular, and the bottom rocky towards the shore.

DODANDOWE is a village with a custom-house on a small river, 4 m. N.W. of Gindurah Town; the river entrance is N. of the village, and has two rocky islets off it, both are less than

1 cable's length from the sandy shore; the N. islet, called Medda, affords some shelter from S. winds to the landing-place at the river's mouth. Manda, the S. islet, is more than a cable's length from the other, and bears N.W. $\frac{1}{2}$ W., $7\frac{1}{2}$ m. from Point de Galle Light-house. Dodandowe outer anchorage is in 6 or 7 fathoms, sand, 2 cables to the N.W. of Medda Islet, and with the breakers on Dodandowe Rocks about S.S.W., but small vessels may go farther in, till Manda Islet disappears behind Medda, and anchor in 5 fathoms, equidistant from Medda Islet, from the sandy shore to the E., and from the Gona Rocks to the N.

Dodandowe Rocks, never above water, though always breaking, lie 2 cables W. by N. of Manda, and there is a fair channel between the islet and those rocks; but Orava Rock, with 6 ft. water on it, is situated a cable's length N.N.W. of Dodandowe Rocks; and Kadul Bank (depth of water not mentioned) is $\frac{1}{2}$ m. S.W. of Manda Islet; so it is prudent to pass W. of all these dangers in either entering or leaving Dodandowe anchorage.

GINDURAH ROCK. This rock under water, called Medda by the natives, lies $2\frac{1}{2}$ m. W.S.W. of the river mouth, and W. by N. $\frac{1}{2}$ N. $4\frac{1}{2}$ m. from Point de Galle Light-house. On its shoalest part there is only 9 ft. water, so it is very dangerous, as it does not always break; a depth of 4 and 5 fathoms is found about a cable's length from it all round, and 15 fathoms 2 cables outside of it. A little shoal coral spot of 3 fathoms lies rather more than $\frac{1}{2}$ m. E.N.E. of it, and there is a depth of 16 fathoms between them. The channel inside of Gindurah Rock should be avoided on account of the above shoal. To clear outside of Gindurah Rock, Akorale Point to the N. must be kept open to the left of Waal Island; or, Oonawatty Point kept open outside the breakers of the Whale Rock. From the shoalest part of Gindurah Rock, the Haycock Mountain (which is 19 m. inland of Gindurah on a bearing of N.N.E.), will be seen about a sail's breadth to the left of a small white-topped rock, called Gull Rock, near the beach, 1 m. N.W. of Gindurah Town. **Godda Bank**, the least water on which is 4 fathoms, with rocky bottom, lies $3\frac{1}{2}$ m. to the N.W. of Gindurah Rock, and $1\frac{1}{2}$ m. S.W. of Dodandowe Village. It may be avoided by keeping Senegamme Point (which is just inshore of Debaha Rock), open to left of Waal Island.

Gindurah River is nearly mid-way between Manda Rock and Point de Galle Flag-staff, and may be known by the different character of the coast on each side of it. To the N.W. of the river entrance the coast is low and sandy, while to the S.E. it is rugged and rocky; there is also a high bank of sand, about $\frac{1}{2}$ m. in extent, where the river runs close to and parallel with the coast before breaking through to the N. of a small rocky point: there is a small red cliff on the opposite side of the river. From Waal or Ragamma Point to Point de Galle, the shore has a level appearance, covered with cocoa-nut trees, and is dangerous to approach under 20 fathoms, being $2\frac{1}{2}$ m. distant; several rocks being situated from 1 to 2 m. in the offing, some of which are nearly dry.

The WHALE ROCK, under water, bears W. $\frac{1}{2}$ N. and is $2\frac{1}{2}$ m. from Point de Galle Light-house, and is nearly $1\frac{1}{2}$ m. from the nearest shore; it always breaks, but in fine weather only once in 4 or 5 minutes, so that a good look-out is then necessary. There is a channel inside of it, with 5 to 10 fathoms water, rocky bottom, but the soundings are irregular; and there is a bank about half-way between the Whale and the shore, with 4 and $4\frac{1}{2}$ fathoms on it, so that the inside channel should not be taken except in case of necessity, as there are many shoal spots within $\frac{1}{2}$ m. of the coast. There are 7 fathoms close outside the Whale Rock, 12 fathoms at $\frac{1}{2}$ m., and 22 about $\frac{3}{4}$ m. off. The soundings between the Whale and Gindurah Rocks deepen gradually from 8 fathoms near both rocks to 20 fathoms mid-way between them.

The Little Whale Rock is a small rock above water, lying about half-way between the Whale and Point de Galle Flag-staff, in the same line of bearing. There are many rocks inside of it, with only from 3 to 6 ft. water on them. Vessels, therefore, when driven to the necessity of passing inside the Whale, should be careful to haul out between it and the Little Whale, where there is a clear channel with 8 to 10 fathoms, rocky bottom. The recent survey of Ceylon marks a small bank, called Cadra-welle, lying $\frac{1}{2}$ m. to S.E. of the Little Whale, but no mention is made of its depth of water.

Banks. The Galle-ho-galle Bank, having 17 fathoms, lies at 2 m. to the S. of the Whale Rock. Latest charts show the Behar Bank, having 30 and 36 fathoms, situated 57 m. to the W. of Point de Galle.

CHAPTER XV.

POINT DE GALLE TO CALCUTTA.

GALLE HARBOUR—DONDRA HEAD—GREAT AND LITTLE BASSAS—BATTICALOA—TRINCOMALEE—POINT PEDRO—JAFNAPATAM—PALK STRAIT—POINT CALYMERE—NEGAPATAM—CARICAL—PORTO NOVO—PONDICHERRY—MADRAS—PULICAT—ARMEGHAM—KISTNA RIVER—MASULIPATAM—GODAVERY RIVER—CORINGA—COCANADA—VIZAGAPATAM—BIMLIPATAM—SANTAPILLY ROCKS—GANJAM—POORNE—OUTTACK—FALSE POINT—POINT PALMYRAS—BALASORE ROADS—PILOT STATION—SAND HEADS—CALCUTTA.

(VARIATION AT GALLE $0^{\circ} 30'$ E.; AT MADRAS, 1° E.; AT CALCUTTA, 2° E.)

The S. half of Ceylon Island is mostly mountain region; and from its great elevation and isolated position, by arresting the winds from all points of the compass, causes a considerable amount of rain-fall to be experienced in some part or other of the island, during every week of the year. The greatest quantity falls on the S.W. portion of Ceylon in the month of May, when the wind is interrupted and its moisture condensed by the lofty mountain ranges surrounding Adam's Peak. This maximum rain-fall anticipates that of the W. coast of Hindostan by more than a month. Thus in June and July (a time of heaviest rain near Bombay) Colombo has very little; but, in Nov. there is another large down-pour, corresponding with that of the Coromandel coast. Thus does the Ceylon climate partake of the characteristics of both Malabar and Coromandel. Since the Light-vessels have been placed near the Bassas Rocks, we learn from their journals, that they have scarcely any rain in the S.W. monsoon; the mountains of the island, to the W. of them, rob the rain-clouds of their moisture.

POINT DE GALLE BAY is formed between Point de Galle Fort and the sloping land to the E., on the highest part of which, at an elevation of 264 ft., stands Edwards Pillar, painted White; from thence the land trends to the S.E., and terminates in Oonawatty Point, which projects farther sea-ward than the true point. The inner part of the bay is between Point de Galle, which is low, and a rocky bluff to the E., named Watering Point, which has a natural red patch on the slope of its W. face, and a white tower for a land-mark. The distance between the two points is a little more than a mile in an E. by S. $\frac{1}{4}$ S. direction, but the actual entrance is narrowed, and the anchorage within much confined, by numerous dangerous reefs, having only from 3 to 15 ft. water over them. At the head of the bay is a low sandy beach, bordered with cocoa-nut trees. Near the centre are two rocky promontories, known as Gibbet Island and Glosenburg. The present anchorage frequented by shipping is in from 6 to 4 fathoms, sandy bottom, on the W. side of the bay, abreast the fort, where supplies of every kind may be procured; but the space is too limited to accommodate the yearly increasing number of vessels visiting this port. The land in the vicinity of Point de Galle is comparatively low and ill-defined; but the position of the bay may be readily known by the light-house which stands at the W. point. On this point the fort and town are built, the sea-front being rendered inaccessible by a line of coral reefs, on which the sea breaks heavily. From the light-house point, extending $\frac{1}{2}$ m. to the S., are several rocky islets, on one of which, Pigeon Island, stands a solitary cocoa-nut tree (1860). These dangers are all above water, and may, therefore, be easily avoided. But the principal dangers are the strong currents which run to E. or to W. (according to the monsoon) past the submerged outer shoals, called the **Cadda Rocks**.

Point de Galle is much frequented as a port of call for orders, in consequence of the electric telegraph, which is in communication with every part of India. Supplies of every kind, including coal, can be obtained. There is a life-boat stationed here. Water may be procured from a small bay within Watering Point, where there is an excellent spring and a wooden pier. Native boats and crews can be hired, to supply ships with water.

Light. A *fixed* White light is exhibited from a white iron tower, 80 ft. high, on the S. bastion of the fort of Point de Galle; the light is 100 ft. above sea level, visible in clear weather 12 m.

OFF LYING DANGERS. **Cadda Rocks** consist of disconnected patches, nearly 2 cables in extent, N. by E. and S. by W., and having 2 fathoms on the shoalest part. There is deep water between the rocks. During the S.W. monsoon heavy breakers extend the whole length of the reef; but in the N.E. monsoon there is seldom a break. The **Outer Cadda**, on which the least water is 13 ft., lies S. $\frac{1}{2}$ E., about $\frac{3}{4}$ m. from the light-house, with the Pilot's Tree (on Moodliar Hill) and Sailor's Bastion in line, and the white mark on the E. side of the bay almost shut in with Watering Point. The **Middle Cadda**, with 2 fathoms on it, lies with the Pilot's Tree open of the almond tree, and the white mark a sail's breadth open of Watering Point. The **Inner Cadda** has 15 ft. on its shoalest part, from which the Pilot's Tree is in line with Flat Rock, and the signal-staff on Neptune's bastion is open to E. of cocoa-nut tree on Pigeon Island. **Para Rock**, having 5 fathoms never breaks; it lies about $2\frac{1}{4}$ cables to E. by N. of the Outer Cadda; from it the light-house and E. end of Elephant Rock are in line; and the white mark is shut in with Watering Point.

The E. entrance. Steamers, or ships with a fair wind, can come in or go out with the signal-staff and light-house in line; passing about 1 cable to E. of Para Rock.

The W. entrance into harbour is between the Inner Cadda and Meemattia Rocks; and if beacons were placed on these, the navigation would be easy. Had there been a mark on the Inner Cadda, those on board of the P. & O. Steamer *Rangoon* (lost there in Nov. 1871) would have noticed the vessel drifting on towards it. A beacon now marks the Outer Cadda.

Rocks on W. side of Channel. **Meemattia Rock** is half a cable in extent, has 17 ft. on it, and breaks in bad weather during the S.W. monsoon. It lies nearly in mid-channel, between the Inner Cadda and the islets off the light-house; from it the E. turret of the church in fort is seen touching the W. side of Elephant Rock, and Flat Rock is in line with Cutchery Police Station. **Polcotte Rock**, has only 3 ft. on it, and always breaks. The marks for it are, the light-house open S. of Flat Rock, and the Button Rock on with left high shoulder of Moodliar Hill. A **Black** buoy is moored in $6\frac{1}{2}$ fathoms, about 30 yards E.S.E. of the Rock. **Bellicatua Rock** has $2\frac{1}{4}$ fathoms on it and forms with the inner Mata-Mada Patch (distant $1\frac{1}{2}$ cables in an E. by N. direction) the narrowest part of the entrance to the W. portion of the bay. The marks for it are, the Pilot's Tree just open to E. of the Gull Rock, and the cocoa-nut tree on Pigeon Island on with N. end of Flat Rock. This rock breaks in bad weather during the S.W. monsoon. **Kapera Rock**, on the W. side of the bay, has on it a shoal patch of only 9 ft. water, from which the cocoa-nut tree on Pigeon Island is on with the centre of Elephant Rock, and the Sun bastion is touching the end of Schwarte Fort. A **Black** buoy is moored in 5 fathoms at $\frac{1}{4}$ cable E. by N. from the 9 ft. patch.

Vellicocco, or Veluvaka Reef, consists of two rocky patches, carrying from 3 to 9 ft. water. The shoalest part of the N. patch, with only 3 ft. on it, is the spot on which the P. and O. Company's steamer *Malabar* struck, causing her total loss in May, 1860. From it the Pilot's Tree is seen just open to E. of the Gull Rock, and Edward's Pillar its own breadth to S. of the white mark; a **Black** buoy is moored in 4 fathoms, E. 40 yards from this patch.

Rocks on E. side of Channel. **Mata-mada Rocks** form two distinct patches about $\frac{1}{2}$ cable apart, and always break. A **Red** buoy is moored in 6 fathoms, W. about 30 yards from the inner and shoalest patch of 6 ft., from which the white gabled chapel, on an eminence outside the fortifications, is just open of Schwarte Fort, and the cocoa-nut tree on Pigeon Island is on with the N. end of Flat Rock. **Wara Rocks** always break, having only 3 ft. on their shoalest part, from which the Pilot's Tree is in line with the arrack store; and the church in fort is on with the almond tree.

Avareea Rock, with 4 fathoms on it, lies directly in the channel, mid-way between the Kapera and Wara Rocks, with the light-house open of Utrecht Bastion, and the Sun Bastion on with rocks off Schwarte Fort. **Cata Rocks** consist of a long ledge, extending in a S. direction from near the W. end of Gibbet Island, towards the Wara Rocks. There are several detached patches on the ledge, with from 1 to 3 fathoms on them, and deep water around. From the W. patch in 2 fathoms, the garrison flag-staff is on with N. end of Schwarte Fort, and the light-house is seen over the angle of Utrecht Bastion; a **Red** buoy is moored in $5\frac{1}{2}$ fathoms about 80 yards W. of this patch.

Imburyuha Rock, with 4 fathoms on it, never breaks. It is the S. part of a rocky ridge of 5 fathoms, one cable in its length N. and S., and bearing W.N.W. $\frac{1}{2}$ m. from Watering Point, with a general depth of 7 fathoms between. The marks for it are, the Pilot's Tree on with the middle of the arrack store, and the light-house in line with Flat Rock. **Deumba-Dava Rock** has 12 ft. on it, and breaks during the S.W. monsoon. From it the white-gabled chapel (on an eminence outside the fortifications) is just open of Schwarte Fort, and Elephant Rock is on with S. end of Flat Rock. **Cabeera Rocks** are two patches, half a cable apart, N. and S., with 5 and 6 fathoms between. From the N. and shoaler patch in 3 fathoms, the white-gabled chapel is in line with Cowedi High Rock, and the church in fort is open to N. of the almond tree. **Kette Rock**, on which the least water is 15 ft., lies with the belfry just open of Schwarte Fort, and the Pilot's Tree

open its own breadth to W. of Alexander's House. **Bocolosava Rock**, is well over by the E. shore of the bay, and is distant $\frac{1}{2}$ m. N. by E. from the nearest part of Watering Point. The least water on it is $3\frac{1}{2}$ fathoms, from which the church in fort appears open to N. of the almond tree.

Rocks in Harbour.—**Tanna Rock**, with $3\frac{1}{2}$ fathoms on it, lies with Pigeon Island cocoa-nut tree open of Utrecht Bastion, and the Pilot's Tree nearly mid-way between the arrack store and Alexander's house (a little nearer the former). **Gull Rock** is a small round rock, about 5 ft. in diameter, and 8 ft. above the sea level. There is a large iron ring on its summit, to which native vessels secure their stern hawsers.

Outer Anchorage. During the N.E. monsoon, the best anchorage in the roadstead of Point de Galle Bay is in 16 fathoms, with the Pilot's Tree and church in fort in line, and the rocks off Oonawatty Point on with a point to the E. of Oonawatty. In the S.W. monsoon vessels seldom anchor in the road, but, should they do so, the best temporary anchorage will be in the same depth of water, with the light-house bearing N.E., and distant about $1\frac{1}{2}$ m. off shore.

Tides. The tidal stream does not exercise any perceptible influence in this bay. It is H. W. on F. and C. at 2 h., and the rise is about 2 ft.

Directions. As the approaches to Point de Galle Bay are rendered dangerous by numerous sunken reefs, it is essentially necessary that vessels should obtain the services of a pilot. In most cases, the pilot-canoe, with flag displayed (*white, red, white, horizontal*) awaits a ship beyond the limits of the off-lying dangers; but as a vessel may have to seek a place of refuge when the heavy sea prevents a boat leaving the bay, the following directions, if closely attended to, will lead into safety. During the N.E. monsoon, from Dec. to March (inclusive), the bay is at all times accessible, and an anchorage can be obtained with facility; for a sea-breeze varying from S.S.E. to W., generally prevails during some part of each day. Early in the morning, the wind is generally off the land from the N., and enables vessels to leave the bay. During the S.W. monsoon, from April to Nov. (inclusive), though the wind frequently veers round even to the N. of W., there is generally a heavy swell setting directly into the mouth of the bay from the S.W.; this sometimes occasions much difficulty in bringing a vessel up in an anchorage already so overcrowded as to compel vessels to be moored by means of stern hawsers, which, if required, are supplied by the local authorities.

Approaching the bay from the W., by bringing Point de Galle Light-house E. by N. $\frac{1}{4}$ N., a vessel will pass clear to the S. of the Whale and Little Whale Rocks; both of which are nearly in the same line of bearing, about W. $\frac{1}{4}$ N. from the light-house; the former being distant $2\frac{1}{4}$ m., and the latter about $1\frac{1}{4}$ m. The rocky islets off the light-house may be approached in safety so long as the church in the fort is kept to W. of the light-house; here the pilot's boat will generally be found.

W. Entrance. To pass to N. of the Cadda Rocks, keep on about an E. course, with Edwards Pillar on with the white tower on Watering Point; this will lead between the Meemattia Rock and the Inner Cadda Rock. Proceed with these marks on, until the W. turret of the church in the fort* is on with Elephant Rock (which is a high, smooth, round-topped rock, unlike any other); then steer about E.N.E. for Gravet Point (the termination of the high land in the N.E. corner of the bay), until the signal-staff on Neptune Bastion is in line with the light-house. Then haul up for the Cutchery Police Station, N. by E. $\frac{1}{4}$ E., which will lead through in mid-channel between the *black* buoy of Polcatte and the *red* buoy of Mata-Mada. When the light-house is shut in with Utrecht Bastion, anchor in about 6 fathoms.

To pass to the S. of the Cadda Rocks, keep the church in the fort to W. of the light-house, until the white mark is well shut in with Watering Point; the rocks off Oonawatty Point will then be open of the point, and in line with a distant point to the E. Then steer to the E. until the Pilot's Tree (the large mushroom-shaped tree on the summit of Moodliar Hill) is on with the Polcatte *black* buoy, bearing N. by W.; the left shoulder of the hill will then be clear of the almond tree near Sailor's Bastion. Haul up for the Pilot's Tree until the signal-staff and light-house are in line, then proceed as above directed, between the Polcatte and Mata-Mada buoys.

Sailing-vessels approaching Galle should be careful to keep a weatherly position to enable them to sail in, and it should be borne in mind that the current sets along the line of coast with great velocity—to the E. during the S.W. monsoon, and to the W. during the N.E. monsoon. Vessels during the S.W. monsoon, by getting to leeward of the port, have taken weeks to regain their position, and, in some instances, have been compelled to bear up for Trincomalee.

Point de Galle is considered a safe place in all seasons of the year, but with strong S.W. winds a ground swell tumbles in. A low sandy beach, with some rocky islets near it, and cocoa-nut trees behind, forms the bottom of the bay, and in the S.E. corner of it, on the N. side of the

* Care must be taken not to confound the white gabled chapel on an eminence outside the fortifications with the church in the fort.

high rocky point at the entrance, there is a wharf, and an excellent spring of water at the bottom of a cove, where a small ship may be careened: this bears from the light-house about E. by S. $\frac{1}{4}$ S. nearly $1\frac{1}{4}$ m. The best anchorage in the Road is to S.W. of these rocks, in 16 to 18 fathoms soft bottom, with the flag-staff on the point bearing from N.N.E. to N.N.E. $\frac{1}{4}$ E., off the town nearly 2 m.; but when any articles are to be landed, or ships being in want of provisions and water, they will have a more convenient berth, by anchoring in the same depth, with the flag-staff bearing N. $\frac{1}{4}$ E. or N. by E. When the S.W. monsoon blows strong, it is unpleasant to anchor in the road.

Oonawatty Point, sometimes called Bellows Point, the S.E. headland of Point de Galle Bay, is steep and rocky, conspicuous to a vessel coming from the E.; Edward's Pillar, 264 ft. above sea, is an excellent land-mark standing about 1 m. to N. of the point. There are several rocks off this point, on the outermost of which, called the **Bellows**, the sea breaks very high in bad weather. This rock bears S.S.E. $\frac{1}{4}$ E. from Oonawatty Point, distant a little more than $\frac{1}{4}$ m., and S.E. $\frac{1}{4}$ E. $2\frac{1}{4}$ m. from Point de Galle Flag-staff. When Oonawatty Point bears N.W. 4 or 5 leagues, it may be known by a clump of trees; and if the weather is clear, the flag-staff and light-house will be seen about two points open to the W.

To approach the anchorage, the Haycock, a little open to the W. of the flag-staff N. by E. $\frac{1}{4}$ E., is a good leading-mark, and with the same bearing, or N.N.E., is the best anchorage in 16 fathoms water, the W. Breakers W. by N. $\frac{1}{4}$ N., and the Bellows or E. Breakers, E.S.E. From Point de Galle Road, the Haycock bears nearly N. by E., distant $6\frac{1}{4}$ leagues. This is a high conical mountain, in lat. $6^{\circ} 20' N.$; it is very conspicuous from the offing, in sailing round the S.W. part of the island from Colombo to Dondra Head. About 3 leagues E. from the Haycock there is a table-hill, with a knob or hummock on it, which is also visible from the road. The land to the W. is generally low, with cocoa-nut trees fronting the sea, but to the E. of Point de Galle it is formed of several ridges of hills, of various aspects.

The bank of soundings extends 3 or 4 leagues to the S. of Point de Galle, on which ships may anchor with a stream or kedge, should the wind fail and the current be unfavourable. S.W. $\frac{1}{4}$ W. 3 m. from Point de Galle Flag-staff is a bank of 17 to 22 fathoms, surrounded to sea-ward by 35, and towards the land from 24 to 26 fathoms. In such case they may anchor in from 20 to 40 fathoms on any part of it, between Point de Galle and Colombo; the bottom is often sand and gravel, but in some places rocky. In coasting along from Galle to the W., a ship ought not to come under 26 or 28 fathoms during the night, until she approach Cultura, for these depths are sometimes found within 3 or 4 m. of the shore. Between Cultura and Colombo the coast is more safe, and may be approached to 15 or 16 fathoms in the day; but these depths are too close to stand in to during the night.

Before Oct. is advanced, strong W. winds and leeward currents render it sometimes very difficult to get round the S.W. part of Ceylon, from Point de Galle to Colombo. The ship *Aurungzebe* sailed from the former place, stood to lat. $6^{\circ} S.$ with W. winds, then tacked to the N.W. and saw the S. part of Ceylon again, in a month after; she stood back to $2^{\circ} S.$, then tacked and stood to the N., till in lat. $7^{\circ} 10' N.$, without seeing land, being to the E. of Ceylon; she tacked again to the S., and got sight of Point de Galle on the ninth week, and on the tenth week reached Colombo.

The COAST to E. of GALLE HARBOUR. The coast from Oonawatty Point to Belligam, or Red Bay, extends E. by S. 4 leagues. The land fronting the sea is low and woody, with hills of a moderate height inland, and about 3 leagues to the E. of Oonawatty Point, near the shore, there is a small island covered with trees, called Woody Island. This part of the coast is steep, and seldom approached under 30 fathoms. **Rassa Muna Hill**, the W. point of Belligam Bay, bears from Woody Island E. by S. 2 m.; the land between them is rugged, of moderate height, covered with jungle, with an occasional tope of cocoa-nut trees, and lined with a reef.

Belligam Bay, called also **Red Bay**, is of considerable depth, and about $1\frac{1}{4}$ m. wide at its entrance: there are two small islands and several rocks above water in the Bay, also several rocks having 6 to 24 ft. on them. The W. island lies close to the beach, on the W. side of the bay; it is called Gan Island; the other, Pigeon Island, lies more toward the middle and N. side of the bay. A reef projects from Rassa Muna Hill more than $\frac{1}{4}$ m. to E.S.E., and extends along the W. side of the bay to Gan Island. Off the inner end of this reef there is a small quoin-shaped rock, called Ruana Rock; on the beach between this and Gan Island is the custom-house and rest-house of Belligam. Paas Rock, having 3 fathoms on it, lies $\frac{1}{4}$ m. E. by S. $\frac{1}{4}$ S. from Rassa Muna Hill, and Cadda Rock, having $4\frac{1}{4}$ fathoms is 1 m. in the same direction. To come into the bay, keep the high cocoa-nut tree on the point inside Woody Island well open, till you bring Ruana Rock on with Gan Island, when haul up for Varumba Rock, a conical rock, elevated about 10 ft. above the

water, and situated at the bottom of the bay between Gan Island and Pigeon Island; this will lead fair between Paas Rock and Cadda Rock, and anchor to the E. of Ruana Rock, in 5 to 6 fathoms water, sandy bottom. It is advisable not to stand too far to the N. of Ruana Rock, in consequence of some sunken rocks which lie between Gan Island and Pigeon Island. On the E. side of the bay lies the village of Mirisse, close to the N. of which are some remarkable red cliffs. There are also red cliffs at Rassa Muna Hill. H. W. on F. and C. at 2 h. 30 m., rise about $2\frac{1}{2}$ ft. **Mirisse Point**, the E. point of Belligam Bay, bears from Rassa Muna Hill E. by S. $\frac{1}{2}$ S. $1\frac{1}{2}$ m. It is the N.W. extreme of a rocky peninsula, presenting a range of cliffs to the sea of about $\frac{1}{2}$ m. in extent, off the centre of which are several rocks above water. Off the point $\frac{1}{2}$ m. is a rocky ledge of 19 to 30 ft., also the "Deumbahullet Rock" detached to the N.W., with 9 ft. on it, with a channel betwixt the ledge and the point carrying 6 fathoms.

Madamura Bank, having 3 fathoms on it, 7 fathoms inside, and 8 close outside, lies about 1 m. from the entrance of Matura River, and the same distance from the nearest shore; it bears from Pigeon Island S.S.W. rather more than a mile, and from Dondra Head W. $\frac{1}{2}$ N. $2\frac{1}{2}$ m. This and all other dangers off Matura and Dondra Head may be avoided by keeping the highest part of the high land of Mirisse Point well open to the land to the E. of it. At $\frac{1}{2}$ m. to the E. of Pigeon Island are some remarkable red cliffs, of considerable height, off which there is anchorage in 10 to 20 fathoms, sand, 1 to 2 m. off shore. There is also anchorage in a small cove close to the E. of Dondra Head, at the village of Kapperlewelle, in 3 to 5 fathoms, sandy bottom.

Matura, in lat. $5^{\circ} 56\frac{1}{2}'$ N., lon. $80^{\circ} 33'$ E., bears about E. $\frac{1}{2}$ S. from Mirisse Point, distant 7 m.: the land between them is moderately elevated, and the coast very steep, having 40 fathoms water in some places within 2 m. of the shore. Matura is a considerable town with a fort, the station of an assistant government agent. It is conspicuous from sea-ward, when it bears between N.N.W. and N.E. Ships may anchor here in the N.E. monsoon abreast the town in 20 and 22 fathoms, sand, shells and ooze, off shore about 2 m.; under 20 fathoms, the bottom is generally foul. Plenty of wood and good water may be procured in the river, the entrance of which is about $\frac{1}{2}$ m. to the W. of the fort; boats going into it to fill water, should have some of the natives as pilots, to guide them clear of the dangerous sunken rocks at the entrance, on which they might be liable to strike and overset by the strong outset. Matura Island, called also Pigeon Island, opposite the fort and near the shore, is small and rocky, resembling a haycock: boats find shelter under it, and the surf being generally high on the shore, canoes are used for passing to the main.

The coast from Matura to Dondra Head stretches S.E. by E. to S.E. by S. about 3 m., and is remarkable on account of some red cliffs about half-way between them, resembling those at Red Bay, only they are more conspicuous.

DONDRA HEAD, the S.-most point of land of Ceylon, in lat. $5^{\circ} 55'$ N., lon. $80^{\circ} 35\frac{1}{2}'$ E., is a low point of land, with a grove of tall cocoa-nut trees on its extremity, by which it may be known. A reef of rocks projects from it about 1 m. to the W., having 9 and 10 ft. water on it, upon which the sea sometimes breaks very high. To the W. of this, ships may anchor in 20 fathoms, abreast the Red Cliffs, where they will be sheltered from N.E. winds; but directly off the extreme point of Dondra Head there is no ground with 100 fathoms line, within 1 or $1\frac{1}{2}$ m. of the shore, so steep is this headland. Directly N. from it about 6 leagues inland, there is a hill, resembling a saddle when seen from the S.E.; and the land along this part of the coast is generally of moderate height, formed of a diversity of hills, which become more elevated in the interior.

Gandura Point, on the W. side of **Gandura Bay**, called also **Galies Bay**, is of moderate height and rocky; it bears from the E. part of Dondra Head E. by N. $\frac{1}{2}$ N. $1\frac{1}{2}$ m. A rock with 3 fathoms lies close to the Point on the S. side, and about half-way between Gandura Point and Kapperawelle are some rocky islets, called Hienia Rocks, close to the shore. The coast is high and rocky, and lined with a reef. The village of Gandura (Galies) lies to the N. of the Point, at the bottom of a small cove, about $\frac{1}{2}$ m. in depth, and one-sixth of a mile wide, having good anchorage in 3 to 6 fathoms, sand and ooze, but exposed to a swell in the S.W. monsoon. **Kapperawelle Point**, on the E. side of Gandura Bay, bears from Gandura Point N.E. by E. $\frac{1}{2}$ E. $1\frac{1}{2}$ m.; the coast between them is high and rocky, and lined with a reef, except at the cove and a place called Nourounce, where there is a sandy beach with a plantation of cocoa-nut trees upwards of $\frac{1}{2}$ m. in extent. Kapperawelle Point is high and rocky, and extends in an E.N.E. direction nearly $\frac{1}{2}$ m., having several rocky islets off its E. extremity, called Linea Rocks, inside which, in a sandy bight, is the village of Cotagodde.

Etala Reef is nearly $\frac{1}{2}$ m. in length; it bears from the E. end of Kapperawelle Point E. $\frac{1}{2}$ N. $\frac{1}{2}$ m., and is rather more than $\frac{1}{2}$ m. from the shore. Half a mile farther to the E., and $\frac{1}{2}$ m. from the shore, is a rock above water, called Bamberee Rock, from which a reef extends to the shore. There are 5 fathoms inside Etala Reef and between it and Bamberee Rock; 5 to 7 fathoms close

outside both; and 7 fathoms to the W. of the Reef. The W. end of Nourounes Beach kept open of Kapperawelle Point clears Etala Reef and Bamberes Rock.

Nilewelle Point, on the W. side of Nilewelle Bay, is in lat. $5^{\circ} 57' N.$, lon. $80^{\circ} 48' E.$, and bears from Dondra Head E. by N. $\frac{1}{4}$ N. 8 m., and from Kapperawelle Point E. by N. $4\frac{1}{4}$ m.; the coast between being of moderate height, covered with jungle, with occasionally a sandy bight and a plantation of cocoa-nut trees. Nilewelle Point is rocky and of moderate height, nearly insulated, being only connected with the main by a strip of sand, over which the sea frequently breaks. There is a remarkable tope of cocoa-nut trees on the Point, which gives it the appearance of a table-land when seen from the E. or the W., and by which Nilewelle may be known. The bay is about a mile in width, its E. point, **Polonha Point**, bearing from Nilewelle Point N.E. $\frac{1}{4}$ E. 1 m.: the land on both sides the bay is high and rocky; at the bottom there is a sandy beach, but lined by a reef, which extends $\frac{1}{4}$ m. from the shore. The village of Nilewelle stands in a small bight on the W. side of the bay, off which is the best anchorage, in from 4 to 10 fathoms water, sandy bottom; but the bank is steep, and the anchorage confined by the reef above mentioned. Vessels anchoring here should take care to shut Tangalle Fort in by Polonha Point, as outside this mark the ground is foul. At 1 m. to the W. of Nilewelle is the small bay and village of Deekwelle, having a rest-house and plantation of cocoa-nut trees near the beach; but the bay is inaccessible, as the reef which lines the coast from Kapperawelle Point to Nilewelle Point extends across it.

Mahawelle Point is high, steep and rocky; it bears from Polonha Point N.E. $\frac{1}{4}$ N. $1\frac{1}{4}$ m.; the coast between forming a bight, at the bottom of which is a small sandy bay, called Sureya-tree Bay, where the coasting dhonies occasionally anchor in 3 fathoms, sandy bottom, close to the beach; in 4 fathoms the ground is foul. To the N. of Mahawelle Point lies **Mahawelle Bay**, having anchorage in its S.W. part in 4 to 7 fathoms water, sandy bottom; in all the other parts of the bay the ground is foul. E. by N. $\frac{1}{4}$ N., $\frac{1}{4}$ m. from Mahawelle Point, lie Mahawelle Rocks; they are of small extent, nearly even with the water's edge, having 8 fathoms water close to all round: and $\frac{1}{4}$ m. from the point in the same direction, are some rocky islets, called Oonacria Rocks, having a narrow channel inside with 5 fathoms water, and 7 to 9 fathoms close to on the outside. These islets are nearly $\frac{1}{4}$ m. from the shore. The best passage into Mahawelle Bay is between them and Mahawelle Rocks, keeping nearer the latter, to avoid a patch called Middle Rocks, one-eighth of a mile W.S.W. of Oonacria Rocks. The channel is clear, near $\frac{1}{4}$ m. wide, with 9 and 10 fathoms water. The passage between Mahawelle Rocks and the Point is also clear, with 8 fathoms water, but is much narrower than the other.

Tangalle Point, in lat. $6^{\circ} 1' N.$, lon. $80^{\circ} 48' E.$, bears N.E. $\frac{1}{4}$ E. $4\frac{1}{4}$ m. from Polonha Point; the coast between is of moderate height and rocky, and, except in Sureya-tree and Mahawelle Bays, lined with a coral reef. This is a hilly point, moderately high, and gradually sloping to the sea; on its summit stands a square fort very conspicuous from sea-ward; also the new Cutchery by which Tangalle may be known. The bay, which is of considerable extent E. and W., but of no great depth, lies to the E. of the Point; the reef extends from the Point $\frac{1}{4}$ m. to the E. Tangalle Rocks, which are above water and steep-to, bear from Tangalle Point E. $\frac{1}{4}$ S. 1 m.; there is a passage between them and the reef, having 5 and 6 fathoms, water, but it is not safe for strangers, as the edge of the reef is not always to be seen; and there is a rock, called Kadul Rock, having only 10 ft. water on it, nearly in the middle. This rock bears from Tangalle Rocks N.W. $\frac{1}{4}$ N. $\frac{1}{4}$ m. Another rock, called Maa Rock, having 16 ft. water on it, bears from Tangalle Rocks nearly $\frac{1}{4}$ m. On these two rocks boats are usually stationed with flags, when vessels are coming into or going out of the bay. A vessel coming in without these boats, or a pilot, should pass to the E. of Tangalle Rocks, and stand to the N.E. till Tangalle Kudda Vehare (a small white pagoda, $\frac{1}{4}$ m. N.W. of the fort) is in one with the high cocoa-nut trees on the S.W. bank of Kunkalla Modere: this mark kept on will clear all dangers; then haul up for Kunkalla Modere, and anchor in 5 to 6 fathoms, sandy bottom, Tangalle Rocks bearing S. by E. to S.E. by S. This is the only spot of clear ground in the bay, and is a space about $\frac{1}{4}$ m. square; farther in, the ground is sand and stones; but a small vessel, having a chain, might in the S.W. monsoon run into 3 or 4 fathoms, where she would be more sheltered by the reef from the heavy swell which sometimes rolls into the bay at that season. To the E. the ground is very foul. Kunkalla Modere is the mouth of a small river: the Kunkalla, which runs into the W. side of the bay $\frac{1}{4}$ m. to the N. of Tangalle Point, and though generally closed by a bank of sand, except after heavy rains, may be distinguished by the gap in the trees. The Custom-house is on the W. side of the bay, between Kunkalla Modere and the Point, and the best landing-place is near it. A reef commences about 1 m. to the N.E. of Tangalle Point, and lines all the E. side of the bay, projecting in some places nearly $\frac{1}{4}$ m. from the shore. The W. side of the bay is low, with plantations of cocoa-nut trees, in which is the town: these extend about $1\frac{1}{4}$ m. from Tangalle Point, to the E. of which the coast is higher, sandy, and barren. **Rackova**

Point, the E. point of Tangalle Bay, bears from Tangalle Point E. by N. $\frac{1}{2}$ N. $3\frac{1}{2}$ m. This is a sloping barren point, surrounded by a reef, which projects about $\frac{1}{2}$ m. from it. Cahandawa Point, a sandy point of moderate height, having a tope of cocoa-nut trees on it, bears from Rackova Point N.E. by E. $\frac{1}{2}$ E. $2\frac{1}{2}$ m., the coast between them forming a bight, having on its E. side some topes of cocoa-nut trees at the village of Cahandawa. It is lined with a coral reef.

CAHANDAWA ROCKS are two rocks bearing from each other N.W. by W. and S.E. by E. $\frac{1}{2}$ m.; the inside one, situated on the edge of the reef, is small and above water; it bears from Cahandawa Point S.W. $\frac{1}{2}$ m. The outer rock, which is in lat. $6^{\circ} 3' N.$, lon. $80^{\circ} 53' E.$, is very little below the water's edge, with other rocks round it. It bears from Cahandawa S.S.W. nearly 1 m., and from Rackova Point E. by N. $\frac{1}{2}$ N. $2\frac{1}{2}$ m. There is a passage between these rocks nearest the outer one, having 5 and 6 fathoms rocky bottom, but it is not safe. Close outside these rocks there are 7 and 8 fathoms water.

Calamatta Point is high and rocky, with a chain of rocky islets lying off it: it bears from Cahandawa Point E. by N. $\frac{1}{2}$ N. $2\frac{1}{2}$ m.; the coast between being sandy and barren.

Levay Rock, very little under water, bears from Calamatta Point S.W. $\frac{1}{2}$ S., nearly 1 m., and is about $\frac{1}{2}$ m. from the shore. The reef runs from this in a line with the coast to the inner Cahandawa Rock to the W., and to the E. inclines towards the shore to Calamatta Point. **Watta Rock**, the outermost of the chain of islets above mentioned, bears from Calamatta Point S.E. more than $\frac{1}{2}$ m. Some rocks project from its outer part S.E. $\frac{1}{2}$ m. There is a passage between Watta Rock and the next rocky islet, having 7 and 8 fathoms sandy bottom. At $\frac{1}{2}$ m. to E. $\frac{1}{2}$ N. of Calamatta Point, and about $\frac{3}{4}$ m. to N. of Watta Rock, there is a rocky patch, nearly even with the water's edge, called Calamatta Rocks; between these and the chain of islets there is anchorage in from 5 to 7 fathoms sandy bottom, and between them and the shore to the N. anchorage in 4 to 6 fathoms sand and ooze off the small village of Calamatta. All the ground to the E. of Calamatta Rocks is very foul: the only landing-place is close to the N. of Calamatta Point; a reef lines the coast of all the other parts of the bay, which projects from its E. side $\frac{3}{4}$ m. Dhonies call here for salt. **Oulandhe Point**, the E. point of Calamatta Bay, is high, sandy, and barren; it bears from Calamatta Point E. by N. $\frac{1}{2}$ N. $2\frac{1}{2}$ m., and from Watta Rock N.E. by E. $\frac{1}{2}$ E. $2\frac{1}{2}$ m. E.N.E. $\frac{1}{2}$ m. from Oulandhe Point are some reddish cliffs, of moderate height, called **Rattana Point**. Some rocks above water lie close off these points inside the reef, which here projects $\frac{1}{2}$ m. from the shore.

Waluwe River bears about E. by N. $\frac{1}{2}$ N. $4\frac{1}{2}$ leagues from Tangalle; the coast between them is low and barren close to the sea, but high inland, and may be approached to 25 fathoms within 4 or 5 m. of the shore. **Godawoy Point** is high, rocky, and barren, and bears from Rattana Point E. by N. $\frac{1}{2}$ N. 4 m.: the coast between is low and barren, except about half way, where there are some topes of cocoa-nut trees, at the mouth of the river Waluwe, and lined with a reef.

IBHAA ROCK, in lat. $6^{\circ} 4' N.$, lon. $81^{\circ} 2' E.$, is very dangerous, being very little under water; it bears from Hambantotte Tower about W.S.W. $4\frac{1}{2}$ m., and from Godawoy Point, the nearest land, S.S.E. $\frac{1}{2}$ E. 1 m. There is a clear passage inside the rock, with 6 and 7 fathoms near the shore, and 8 or 9 near the Rock, irregular rocky bottom; between Nehinde and Ibhah Rocks there are 9 and 10 fathoms, and close outside both 10 fathoms. From the form of the land no good marks can be given to clear these rocks, which generally break: a ship should not, therefore, come under 16 fathoms in the night, when near them; nor even in the day, unless the rocks are seen, until Hambantotte Tower bears N.E. by N. or N.N.E.; this depth will be about $\frac{1}{2}$ m. outside the rocks: there are 20 fathoms in about $1\frac{1}{2}$ to 2 m. outside of them. **Nehinde Rock** is very dangerous, being nearly level with the water's edge, and steep all round; it bears from Hambantotte Tower S.W. by W. $\frac{1}{2}$ W. $3\frac{1}{2}$ m., and is 1 m. from the nearest shore. There is a clear channel inside it, having in it 5 fathoms near the shore, and 8 or 9 close to the Rock.

Hambantotte Point, in lat. $6^{\circ} 7' N.$, lon. $81^{\circ} 7' E.$, is high, sandy, and barren. It bears from Godawoy Point E. by N. 5 m.; on its summit stand a round tower and several houses, among which are the residences of the commandant and the assistant government agent of the station. To the N.E. of the Point is the small **Bay of Hambantotte**, with anchorage in it from 4 to 7 fathoms, sand and ooze. To the E. of the Point there is also anchorage in 8 or 10 fathoms, sand. The town is at the bottom of the bay, near the Point. This is the principal place of export for salt, and vessels calling here for that article should, in the N.E. monsoon, anchor to the E. of the Point; but in the S.W. monsoon they should run farther into the Bay, so as to be in some measure under the lee of the Point, where they will be less exposed to the swell, and where the boats can pass to and fro with greater facility. All dangers are visible. **Levay Point**, the N.E. point of Hambantotte Bay, bears from Hambantotte Point N.E. $\frac{1}{2}$ N. $1\frac{1}{2}$ m. **Patterajah Point** is of moderate height, sandy and barren; it bears from Hambantotte N.E. by E. $\frac{1}{2}$ E. $6\frac{1}{2}$ m.; the coast between being sandy and barren, and lined with a reef.

Dorava Point, called also **Mago Point**, a flat rocky point of moderate height, bears from Hambantotte E.N.E. about 12 m., and from Patterajah Point E. by N. $\frac{1}{4}$ N. 6 m., the coast between being moderately high, sandy, and barren. About $1\frac{1}{2}$ m. to the N.E. is the mouth of the small river Kirinde, near the village of Mahagam: this river is shut by a rocky bar; about S. by E. $\frac{1}{4}$ E. 8 m. from the Point, breakers were said to exist. **Lanceeya Rock**, a small rock above water, bears from Dorava Point S. $\frac{1}{4}$ m. Rocky patches extend from hence to the shore with 5 to 7 fathoms betwixt them. **Dorava Rock**, having on it 3 fathoms, with 10 and 11 all round, bears from Dorava Point S.E. $\frac{1}{4}$ m. and from Lanceeya Rock E. more than $\frac{1}{4}$ m. This may be avoided by not coming under 13 fathoms till the highest peak (1,972 ft.) of the Katteragamme Hills (a ridge of undulating hills nearer the sea than any other high land) is in one with Kirinde Point. **Kirinde Point** bears from Dorava Point N.E. $\frac{1}{4}$ N. $1\frac{1}{2}$ m.: this is a rugged, rocky point, of moderate height, having several large rocks on its summit, one higher than the rest; near which, on a mound of earth, a temporary flag-staff is sometimes erected. There are the remains of an old tank close to this, which still contains good water. Several detached rocks lie off this point, above and under water, off shore nearly $\frac{1}{2}$ m. This is a place of export for salt, but it is uninhabited, except by the people employed by Government in the shipping of salt, and who are sent from other stations when required. The salt-stores are on the beach at the bottom of the small bay to the N. of the Point, off which dhonies and small craft anchor, in 3 to $3\frac{1}{2}$ fathoms, water; but a patch of sunken rocks, and Kerinde Rock, with 7 ft. water on it, lie in the passage, rendering this anchorage difficult of access. The best anchorage is in 9 to 10 fathoms, with the N. end of the salt stores open of the high part of the Point, but not so far out as to be on with the outer detached rocks;—the high rock on the summit of the point above mentioned will then bear W.N.W. to N.W., and the outer detached rock from N.W. to N. $\frac{1}{4}$ W.; to the N.E. of this the ground is foul. The **Great Basses Rocks** bear from Kirinde E. by S. $8\frac{1}{2}$ m., the channel between them being clear of danger, with from 10 to 18 or 20 fathoms in it.

Paltopane Point is low and sandy, and bears from Dorava Point N.E. by E. $3\frac{1}{4}$ m., the coast between them being barren and sandy, lined with a reef. About $\frac{1}{2}$ m. to the N.N.E. of Paltopane Point, on the summit of the rising ground, near the beach, where the coast forms a sort of bight, stands Paltopane Fort. **Elephant Hill** bears from Dorava Point nearly N.E. $\frac{1}{4}$ E., distant $4\frac{1}{2}$ leagues; it is very remarkable, being a high isolated rock on the low land close to the sea. The coast from Dorava Point to Elephant Hill is rather low, barren and sandy near the sea, and may be approached in daylight to 24 or 25 fathoms, but not under 32 fathoms in the night, particularly in the vicinity of the Great Basses.

The **GREAT BASSAS** or **BASSES**, called **RAMANPAAJ** by the natives, is a dangerous reef of rocks, in lat. $6^{\circ} 10' N.$ lon. $81^{\circ} 28' E.$, 6 m. distant from the nearest part of the S. coast of Ceylon, about $\frac{1}{2}$ m. broad and a mile long, in a N.E. and S.W. direction, and being nearly 8 ft. above the surface of the ocean. The reef is one continuous rocky field, portions only showing here and there in the wash of the sea; the N.E. part is the highest and broadest, where there is a large rocky ledge forming its E. end, partially detached from the S. part or main body of the reef. It has deep water on all sides to within $\frac{1}{2}$ m. of it: thus there are 16 to 19 fathoms on the S. side, 11 and 12 fathoms on the W., 9 and 10 fathoms on the N., and 7 and 8 on the E. sides: but beyond these depths, on the W. side, about 1 m. off, there is a patch of 8 fathoms; and on the E. side, at $1\frac{1}{2}$ m., there is another of 5 fathoms, with deeper water between it and the reef. From the N.E. part, Katteragamme Peak bears N.W. by N.; Elephant Hill about N.; and Nipple Peak N. $\frac{1}{4}$ E. This line of direction also passes a little to E. of the Little Elephant, a round-topped hill, of 105 ft. elevation, close to the beach.

A **Light-vessel**, in lat. $6^{\circ} 11' N.$, lon. $81^{\circ} 28' E.$, showing a Red light, *revolving* once in 45 seconds, has been placed in 12 fathoms, at $\frac{3}{4}$ m. to N.N.E. of the rocks (whilst the light-house* on them is being built). The light-vessel has two balls vertical at the main-mast head.

The **LITTLE BASSAS**. The centre of this reef, in lat. $6^{\circ} 22\frac{1}{4}' N.$, lon. $81^{\circ} 43' E.$, bears N.E. $\frac{1}{4}$ E., distant 20 m. from the N.E. part of Great Bassas, and being only 2 ft. above water is even more dangerous. It appears to consist of large boulders, which even by daylight are scarcely perceptible from a ship until close up to them. The extent of that portion usually shown by breakers is not more than $\frac{1}{2}$ m. across, about E.S.E. and W.N.W., but on a bearing of W.S.W. from its W. part, there are many sunken patches, breaking much in heavy weather, so that occasionally the sea covered with surf is $1\frac{1}{2}$ m. in extent.

* Light-houses are now being erected upon both Great and Little Bassas. That on the Great Bassas is expected to be lighted from this year (1873), showing a Red light, *revolving* once in 45 seconds, elevated 110 ft. above the sea, visible about 16 m. in clear weather. In foggy weather, a bell will be sounded at intervals of $7\frac{1}{2}$ seconds. This will supersede the light-vessel at the Great Bassas.

The Little Bassas is not more than $4\frac{1}{2}$ m. from the nearest part of Ceylon, and on its N. and W. sides there are patches of shoal water, one of which, named the 3-fathom tail, carrying the least water, 3 fathoms, bears N. by W. distant $1\frac{1}{2}$ m. from it. It is of very limited extent, with $3\frac{1}{2}$ and 4 fathoms water close around it. There was much difficulty sometimes in discovering the Little Bassas, especially when approaching them from the W., while the sun is to the E. When sounding off the coast in 1860 H.M.S. *Cyclops*, on hauling in from deep water for the mark, the Chimney, had no bottom with 110 fathoms of line, and almost the next cast soundings in 9 or 10 fathoms, with the breakers just perceptible close aboard of her—a practical proof of the steep nature of the bank in the vicinity of the reef on its outer side, and of the danger in approaching from the E. and S., on any course from W.N.W. to N. by E., inclusive.

The following bearings are taken from the reef:—Chimney Hill, N.W.; the Nipple, N.W. by W. $\frac{1}{2}$ W.; the Elephant, W. $\frac{1}{2}$ S.; Katteragamme Hill, W. $\frac{1}{2}$ S. By seeing one of the above objects on the bearing stated against it, the mariner will know that the Little Bassas Reef is in the same direction. No ship, by night, should be within a distance of 4 m. with no bottom at 150 fathoms nor, by day, within 2 m.; and no ship should ever attempt to pass between the reef and the Ceylon shore. The *Dædalus* Shoal bears N.N.W. 3 m. from the Little Bassas.

The *Atlas* Reef, bearing N.E. $\frac{1}{2}$ N. $1\frac{1}{2}$ m. nearly from the centre of the Little Bassas, is another patch of 3 fathoms with 4 and 5 fathoms, water, close around it; being most probably where the *Atlas* grazed the second time in getting out clear of the shoal water. Between the *Atlas* and Little Bassas, and clear of the 5-fathom line around the reefs, is a space at least $\frac{1}{2}$ m. wide, with depths varying from $5\frac{1}{2}$ to 8 fathoms, water. This being good holding-ground, is the position best adapted for a light-vessel for the Little Bassas; and if moored in 6 fathoms of water nearly, about half-way and a little to W. of a line from this reef to the *Atlas* Shoal, it would be sufficiently clear from tailing into shoal water in either the S.W. or N.E. monsoon.

A Light-vessel, in lat. $6^{\circ} 23\frac{1}{2}'$ N., lon. $81^{\circ} 43'$ E., carrying a *fixed* light, 33 ft. high, which *flashes* once every $1\frac{1}{2}$ minutes, is now moored there in 5 fathoms, about 3 cables to N.E. of the Little Bassas, with the rocks above water bearing S. by W. $\frac{1}{2}$ W.

CEYLON S.E. COAST. The first land seen from a ship approaching the Bassas from the W., is the Katteragamme range of hills, the nearest and highest of which is 7 m. distant from the sea. These hills are sometimes conspicuous both from the E. and W., when others nearer to the sea are hardly discernible. Their summit presents an irregular ridge, the N.E. peak of which is the highest, 1,972 ft. above the sea. The next to the E. is the **Elephant Hill**, conspicuous from standing alone on the low land near the shore, and bearing a remarkable resemblance to the animal from which it is named. It is 2 m. from the beach, bare and destitute of trees, and is 480 ft. above the level of the sea. Farther inland, and bearing from Elephant Hill, N. $\frac{1}{2}$ E., about $9\frac{1}{2}$ m. distant, is Nipple Peak, 903 ft. above the sea. Rendered conspicuous by its elevation, which places it as if alone, this peak is also distinguished by a flattened summit, with two lumps (one at each end) in a direction about W.S.W. and E.N.E.; the W. nipple is the higher. This hill may also be known by a remarkable cone W.S.W. of it, generally distinguishable, but more so from the E., although only 520 ft. above the sea. **Chimney Hill**, or Peak, of much service to a ship formerly, in ascertaining her position in reference to the Bassas, is 445 ft. above the sea, being the highest part of a low range, which takes an E. and W. direction. It appears to be separated from the W. part of the range, and bears N.W. from the Little Bassas. It is $4\frac{1}{2}$ m. from the nearest beach, and is very conspicuous.

Potana Point, (having a sand-hill 105 ft. above sea) in lat. $6^{\circ} 21'$ N., lon. $81^{\circ} 33'$ E., is situated more than one-third of the distance along the coast, between Elephant and Chimney Hills; and off this point is the only anchorage in-shore that was found available. This anchorage was in from 5 to 6 fathoms water, with the point bearing about W.S.W. Potana Point forms perhaps the deepest bay on this coast, and would afford shelter in the S.W. monsoon for small craft not drawing more than 10 ft., but a heavy sea always setting into it throws the surf up to the head, permitting no one to land or embark without getting wet. Off the point, and also to the S.W. of it, the shore is beset with detached rocks for a mile out, with some showing and others covered, on which the sea is always breaking; a rocky sandy shore wherever there is a point.

ELEPHANT SHOAL. The S.W. end of this shoal bears N. $\frac{1}{2}$ E. from the N.E. part of the Great Bassas, distant nearly 7 m. From thence its heavy breakers extend N.E. $\frac{1}{2}$ E. above $1\frac{1}{2}$ m., and from 150 to 250 yards across. There is a channel between it and the shore of Ceylon of 8 and 9 fathoms, being $1\frac{1}{2}$ m. broad, but reduced to $\frac{1}{2}$ m. by some rocks off Annadowe Point, and the next point to E., on which is the Little Elephant Hill. About E.N.E. from the N.E. end of the Elephant Shoal, is the centre of **Potana Shoal**, a rocky patch about $\frac{1}{2}$ m. broad, on which the sea always breaks. No broken water was seen between it and the Elephant Shoal.

Cyclops Reef, bearing E. by N. $\frac{1}{2}$ N., about $1\frac{1}{2}$ m., from the centre of the Potana Shoal, is from $2\frac{1}{2}$ to $3\frac{1}{2}$ m. off shore, extending at least 4 m. in an E.N.E. direction, with 12 to 18 ft. thereon, and is very dangerous. Its E. end bears W.S.W., and 7 m. from Little Bassas.

Dædalus Shoal. This shoal is a small narrow patch of 15 ft., bearing N.N.W. 3 m. from the Little Bassas, and $1\frac{1}{2}$ m. off shore, with Chimney Hill bearing N.W. by W. It is steep-to. There is a good channel within all the shoals, that may be taken in case of necessity, by keeping about a mile off shore.

NAVIGATION of the S. and S.E. COASTS. There is deep water between the Great Bassas and the land, the shore of which is clear at the distance of 2 to 4 m. from it all the way to Galle. A ship bound to the W., after clearing the Little Bassas, and certain of daylight, if keeping a good look-out, may haul in to pass the Great Bassas, and may do the same going E. to pass the Little Bassas, after passing the former. But should a ship from any unforeseen circumstances by night find herself on any part of the coast inside of them, without seeing the lights on both Bassas, it would be better to anchor instantly and wait for daylight, to get her position and soundings; but the S.E. part of Ceylon must not be approached within a distance of 6 m., to avoid a long narrow shoal on the S. point of which was found a cast of $4\frac{1}{2}$ fathoms. It is not improbable there may be less water than this, for in standing along shore close outside for 4 m. in 7 to 9 fathoms, discoloured water was distinctly seen, with the appearance of a deep channel inside. The coast is clear as far as Galle, and may be approached safely to 2 m. distance, but only in daylight, as it is impossible to judge of distances accurately by night.

The Currents about the S.E. coast of Ceylon appear to gain strength with the wind, and about the Bassas are most irregular: they cannot be allowed for; and the only way of avoiding danger was to give the rocks a wide berth, although it incurred a great loss of time. But the lights now render navigation more easy; and, with a good chart, much time may be saved in a steamer by going inside the Bassas. Currents from Nov. to April are constant to the S.W.; from June to Sept. they run with the S.W. monsoon to the E. past the Great Bassas, whilst the Little Bassas Light-vessel occasionally swings to a S. current which is mostly felt between Point Pedro and Trincomalee during the S.W. monsoon.

Under the Little Bassas, or within them, a set of tide directly to windward has been occasionally felt, the wind blowing strong enough at the time to keep the ship quite broadside on; but this seldom or never lasted more than two hours. At the Great Bassas it was never felt, and only occasionally as far W. as the anchorage off Potana, and the greatest strength found at the Little Bassas was $\frac{3}{4}$ knot per hour.

The Course from Dondra Head to the Great Bassas is E. by N. $\frac{1}{2}$ N., distance $18\frac{1}{2}$ leagues; but the prudent navigator ought not to place much confidence in the distance run by the log during the night, for the currents are frequently strong, and their direction uncertain. In the S.W. monsoon, when the wind blows strong along the S. coast of Ceylon, the current runs with it to the E.; a ship passing then from Dondra Head will be sooner abreast of the Great Bassas than expected. In a run of 24 hours from Point de Galle, the log gave only 46 m. from thence to the E. part of the island. These strong E. currents are not constant in the vicinity of the Great and Little Bassas; for there, and along the E. side of the island, the current frequently sets to the S. in the S.W. monsoon, and almost constantly so during the other monsoon.

If a ship, in settled weather, in the daytime, adopt the inside channel, she ought to proceed as the direction of the wind may render necessary, borrowing towards the Basses to 12 or 14 fathoms, and to 8 or 9 fathoms near the main. Some ships, after passing Dondra Head, steer in the night E. and E. by S. in the S.W. monsoon, to give the Basses a good berth, which carries them so far off the land that they are obliged to haul to the N.W. at daylight, close to the wind, on purpose to regain it; and the whole of the following day is sometimes spent before they are enabled to approach the coast along the E. part of the island. Other ships steer a course inclining towards the shore, and are thereby liable to run into great danger during the night; some have narrowly escaped destruction, whilst others have been wrecked. His Majesty's ship *Dædalus* was unfortunately lost on the rocks, about midway between the Little Bassas and the main, and several of the 1,200 tons ships under her convoy, bound to Madras and China, were nearly sharing the same fate. The dry haze, which prevails greatly about this part of Ceylon, deceived them in their distance off the land, thinking themselves farther from it than they really were; and without great caution strangers are very liable to make this mistake.

To avoid disasters, a ship being abreast of Dondra Head, at 2 to 4 leagues' distance in the S.W. monsoon, ought to steer about E. by N., or E. by N. $\frac{1}{2}$ N., according to the distance from the land, taking care to sound in time, if it be night. Although the coast near Dondra Head is steep, with deep water near the shore; about 10 leagues to the E., soundings extend farther out, and from

thence to the Great Basses are pretty regular; the bottom sandy, often mixed with mud. From the Great Basses to the distance of 8 or 10 leagues to the W., the depth is usually 30 fathoms about 2 or 3 leagues off shore, towards the Basses; and the same depth about 3 to 5 m. off shore farther to the W. Where the depth is more than 40 fathoms, the bank in general shelves quickly to no ground. Having run in the night 8 or 10 leagues to the E. of Dondra Head, the lead should be attended to as the best guide, keeping under moderate sail if the wind is brisk, that good soundings may be obtained by heaving-to, or otherwise. Having got soundings, a ship should not come under 36 fathoms, in steering a course parallel to the coast, and should keep the lead going, particularly when approaching the meridian of the Great Basses; then haul out a little on the edge of soundings if the night be dark, and the light not seen, or the weather unfavourable; but if the night be clear, with settled weather, she may keep in soundings between 34 and 40 fathoms, taking care not to come under 36 fathoms; she will then pass about 2 m. outside the Great Basses Light, which is as near as can be done with prudence in the night.

The passage inside the Great Bassas may now be easily taken, but all vessels should pass outside of the Little Bassas. In daylight, with a steady breeze, a ship may borrow towards them, but not approach the light-vessels on the S. and E. nearer than $1\frac{1}{2}$ m. Having passed the Great Basses in the night, a course may be steered about N.E. by E. to pass the Little Basses, which are distant $6\frac{1}{2}$ leagues from the former, attending particularly to the lead, and not coming under 60 fathoms until the light-vessel is seen. Coming from the N. in the night, with the wind fair, or from the land, keeping on the edge of the bank of soundings may be adopted, keeping a good look-out for the Lights, and in dirty weather not to come nearer than 40 or 50 fathoms. As a ship may sometimes be greatly retarded or accelerated in her progress by uncertain currents, it will be prudent not to borrow under 70 fathoms in the night, on any part of the S.E. coast of Ceylon; more particularly as they sometimes set towards the shore about the Basses, but generally to the S. or S.W.

General Remarks on the S.W. and S. Coast. The coast from Bentotte to Dondra Head presents a succession of sandy bights covered with cocoa-nut trees, with intervening rocky points or cliffs; the land near the sea is generally low, but increasing in height inland in ridges of irregular hills; the most conspicuous of these is the Haycock, a conical mountain, in lat. $6^{\circ} 20' N.$, lon. $80^{\circ} 17' E.$ From Dondra Head to Tangalle, the coast assumes a more rugged, rocky appearance, the plantations of cocoa-nut trees are fewer and of less extent. To the E. of Tangalle the coast is sandy and barren; a few tops of cocoa-nut trees are to be seen between Tangalle and the Waluwe River, but none to the E. of the latter. The hills fall farther back as you advance to the E., leaving a level space between them and the sandy hillocks near the sea, in which are salt and marshy grounds.

The bank of soundings gradually extends farther from the shore as you increase the distance from Dondra Head: off Bentotte, at a distance of 3 m., there are 20 fathoms, at $4\frac{1}{2}$ m. 30 fathoms. At $1\frac{1}{2}$ m. off Akorale there are 20 fathoms with coral shoal patches, and 30 fathoms at $2\frac{1}{2}$ m. Off Galle the soundings are more regular. From the vicinity of Gindura and Whale Rocks at $2\frac{1}{2}$ m. off shore, are 26 fathoms, while at a distance of 3 m., or $\frac{3}{4}$ m. outside these rocks, there is a depth of 33 fathoms. Off Belligam, at $1\frac{1}{2}$ m. distance, are 20 fathoms, and 30 fathoms at $1\frac{1}{2}$ m. At $\frac{1}{2}$ m. off Dondra Head there are 20 fathoms, 30 at $1\frac{1}{2}$ m., and 50 at 2 m. distance. Three miles off Tangalle there are 20 fathoms, and 30 at $3\frac{1}{2}$ to 4 m. Off Hambantotte, at $3\frac{1}{2}$ m. distance, are found 20 fathoms, and 30 at 5 m. from the shore. From 30 fathoms the water deepens less rapidly, 40 fathoms being the depth at 2 and 3 leagues from the land, except in the vicinity of Dondra Head. To the W. of Dondra Head, 25 fathoms will carry clear of all dangers; but it would not be prudent to approach the shore so close in the night, when in the vicinity of some of the dangerous rocks described above. To the E. of Dondra Head, as far as the Great Basses, 20 fathoms will clear all dangers. To pass outside these rocks in the night, a ship should haul out when approaching them into 40 fathoms water. In fine weather, when the land and lights can be distinctly seen, a ship may pass inside the Great Basses in the night, keeping about 3 m. from the shore; but care must be taken not to pass during the night inside the Little Basses Light. By day a small steamer, having a good chart, may do so, but she must borrow towards the Light-vessel, to avoid the Dædalus shoal; the channel between them is not $1\frac{1}{2}$ m. broad. When passing *inside* the Great Bassas, and steering to the E., be careful not to shoal under 15 fathoms off the *Cyclops* Reef, which lies from 7 to 11 m. on a W.S.W. bearing from the Little Bassas, and 4 m. off Potana Point.

THE COAST from Elephant Hill, extends about N.E. by E. $5\frac{1}{2}$ leagues, to the high sandy point of Julius Nave, being low, barren, and sandy, fronting the sea; but this part is seldom approached, as few ships pass inside the Great Basses, unless by accident or in a case of necessity. A large ship ought not to pass between the Little Basses and the shore, on account of the rocks in that channel, already mentioned in the description of those dangers. From Julius Nave Point,

in lat. $6^{\circ} 20\frac{1}{2}'$ N., lon. $81^{\circ} 43'$ E., and nearly 7 m. due N. of the Little Basses, the coast lies N.N.E. $\frac{1}{2}$ E. 16 m., to another small projection, called Magame, which bears from the Little Basses about N. by E. $\frac{1}{2}$ E. $5\frac{1}{2}$ or 6 leagues, and is said to have shoal water extending from it $\frac{1}{2}$ m. This part of the coast is also low and sandy, facing the sea, with Chimney Hill, 445 ft. high, and others, a little inland to the W., already described. The soundings on the bank stretching along this part of the coast are generally regular, and give sufficient warning when it is approached in the night; the depths are 17 and 26 fathoms from 1 to $2\frac{1}{2}$ leagues off, and between 40 and 50 fathoms near the edge of the bank, from 4 to 5 leagues off shore.

Aganis, or Agaas, in lat. $6^{\circ} 50'$ to 7° N., is a space of land with some hillocks near the sea; the most prominent point of this, called **Saukiman Kandy**, is the E.-most part of Ceylon Island, in lat. $7^{\circ} 2'$ N., lon. $81^{\circ} 53'$ E. Off this point, and for 3 or 4 m. to the N., H.M.S. *Cyclops* found a shoal bank of 4 fathoms. Between the hilly land of Aganis and the hills to the N.W. of the Little Basses there is a considerable space of land, all low, except an isolated mount, which has a regular peaked appearance when viewed from the E., but resembles a saddle, having a gap in it, when seen from the S. From the Little Basses to the land of Aganis the course is about N.N.E., and the distance 9 leagues; between them, the coast may be approached with safety to 19 fathoms, about $1\frac{1}{2}$ leagues off shore, the depths on the bank being pretty regular, generally sandy bottom; and the edge of it, where there are 45 and 50 fathoms, is distant $4\frac{1}{2}$ or 5 leagues from the shore. At 22 m. inland from Aganis, there is a table-mount, called **Westminster Abbey**, in lat. $7^{\circ} 5'$ N., lon. $81^{\circ} 29'$ E., with a large square knob or turret on its N. end, and there is a peaked hill near the sea, generally called **Aganis Peak**, 767 ft. high; these are in one with each other, bearing W. $\frac{1}{2}$ S. The general outline of the S.E. coast of Ceylon is convex to the sea, rounding gradually without any conspicuous headlands. Between lat. $6^{\circ} 30'$ and 7° N. is an advisable place to make the land, for ships running towards the E. part of the island in the N.E. monsoon, taking care in the night to fall in with it to the N. of the Little Basses.

The coast between Aganis and Baticolo River is generally very low near the sea, interspersed with plantations of cocoa-nut trees, and some houses or small villages. In this space a ship may generally borrow to 19 or 20 fathoms, these depths being from $2\frac{1}{2}$ to 3 or 4 m. off shore, and the bank of soundings extends from it to the distance of $2\frac{1}{2}$ or 3 leagues, where the depths are from 45 to 70 fathoms, but not always regular; for in a few places, within 4 m. of the shore, there are 35 and 38 fathoms. In working during the day, a ship may in some parts venture into 16 or 18 fathoms, and tack within 2 m. of the shore; but 20 or 22 fathoms is as near as it should be approached in the night; for in these depths, if the moon shines bright, the surf will be seen breaking on the sandy beach, or the noise of it may sometimes be heard with the land-wind. From some of the small projecting points foul ground is said to extend about 1 or $1\frac{1}{2}$ m., rendering it prudent not to come under 20 or 22 fathoms near them, particularly in the night. Nearly abreast of the Friar's Hood Mountain, but rather to the S., in about lat. $7^{\circ} 16'$ N., is the entrance of Singaratopu River, which extends a great way inland, having to the S. a pagoda, among a grove of cocoa-nut trees, at a place called Tricoll.

Kara-tivo is in lat. $7^{\circ} 21'$ N., and to the N. of this place, the coast consists of islands, with lagoons or back-waters, which extend beyond Baticolo. The coast contiguous to Baticolo is low, but several mountains or hills inland are conspicuous in sailing along this part of the island. The most remarkable and highest of these, 1,563 ft. in height, is the **Friar's Hood**, in lat. $7^{\circ} 26\frac{1}{2}'$ N., lon. $81^{\circ} 28'$ E., at $6\frac{1}{2}$ leagues from the sea, and leaning over to the left, resembles a friar's hood when bearing to the S.W., but has the form of a pyramid when it bears to the N.W.. To the S. of it there is another mountain, somewhat similar in appearance, called the False Hood, which is not so high as the former. Five and a quarter leagues to the W.N.W. of the Friar's Hood there is a round conical hill, called the Kettle Bottom, visible in clear weather, in lat. $7^{\circ} 32'$ N., lon. $81^{\circ} 13\frac{1}{2}'$ E., about 10 leagues W.S.W. from the entrance of Baticolo River, and W. by N. $\frac{1}{4}$ N. from the entrance of the river, is a sharp isolated cone, 532 ft. high, called the Sugar Loaf, in lat. $7^{\circ} 49\frac{1}{2}'$ N.

Alphee Shoal, in lat. $7^{\circ} 24'$ N., lon. $81^{\circ} 50'$ E., where the large French steamer (of that name) struck, in 19 ft., lies about 3 m. to N. of Kara-tivo.

BATICOLO, or BATTICOLOA RIVER, in lat. $7^{\circ} 44\frac{1}{2}'$ N., lon. $81^{\circ} 40\frac{1}{2}'$ E., is narrow at the entrance, not discernible except from the N., the opening being in that direction; but it may be known by a house and flag-staff, where the colours are usually shown to passing ships. There are 6 ft. on the bar at L. W., and the tide rises and falls about 2 or 3 ft.; H. W. at 5 h. on F. and C. of moon, but not always regular. A shoal-spit of 3 fathoms extends off the point $\frac{1}{2}$ m. There is a small rocky bank, having 12 ft. water, which lies nearly $1\frac{1}{2}$ m. to N.E. by E. of the flag-staff. The fort is $2\frac{1}{2}$ m. up the river, on an island, where water may be procured from a well; buckets must be taken on shore to draw up the water, and the casks are landed at the wharf, and rolled to

the well. Wood may be cut near the bar, on the banks of the river. The anchorage in the road is not always safe in the N.E. monsoon, when a gale from that quarter may be liable to happen from Sept. to Feb.; but in the S.W. monsoon it is safe. Ships generally anchor to the N.W. or W. of the reef, with the entrance of the river about S., the Friar's Hood S.S.W., a vessel being distant about $1\frac{1}{2}$ m. from the river's entrance, abreast of a cluster of rocks projecting from the shore to the N. of the river.

Her Majesty's ship *Terpsichore*, at anchor in $8\frac{1}{2}$ fathoms, off shore about $1\frac{1}{2}$ m., had the Friar's Hood nearly in one with the entrance of Baticolo River, and the Sugar Loaf W. by N.; a rock even with the water's edge S.W. by W.; the N. extreme of land about N.W. by N.; and the S. extreme S.E. $\frac{1}{2}$ S. At the distance of $2\frac{1}{2}$ m. E. by S. $\frac{1}{2}$ S. from the ship, a rock was found with 12 ft. water on its shoalest part, on the deepest part $3\frac{1}{2}$ fathoms, being a cable's length in extent, and lies N.E. $\frac{1}{2}$ E. 2 m. from the entrance of the river. A little outside of it, there are 9 and 10 fathoms clear ground, and close-to, 8 fathoms; on the inside, close to it, from 5 to 7 fathoms rocky bottom. By keeping the notch in the grove open, and distant from the shore not less than 2 m., you will be clear of the danger. From the rock, the Friar's Hood bore S.W. by S., the entrance of the river W. by S. $\frac{1}{2}$ S., Sugar Loaf W. by N., and the notch in the grove just shut in, bearing S. About a mile S.E. by E. $\frac{1}{2}$ E. from the ship, and rather more than a mile from the shore, 20 ft. water was found on a shoal, which joins to a coral bank stretching 3 or 4 m. parallel to the shore, having uneven ground on it from 4 to 7 fathoms. In coming from the S., be careful to keep the notch, or two groves of cocoa-nut trees, open, until the Friar's Hood bears S.S.W., then you may run in with safety, crossing the coral bank in 6 and 7 fathoms; continuing to steer in toward the shore, you will deepen to $8\frac{1}{2}$ and 9 fathoms: there the ground is composed of coarse brown sand, with small broken shells; the entrance of Baticolo River will then be open, bearing S.S.E.; by night, to clear all these shoal-patches, do not come under 24 fathoms, keeping the lead going, and by day you may borrow to 19 fathoms about 3 m. off shore.

Venloos, or Vendeloos Bay, or Inlet, in lat. $7^{\circ} 58\frac{1}{2}'$ N., lon. $81^{\circ} 32\frac{1}{2}'$ E., bears from the entrance of Baticolo River N.N.W. $\frac{1}{2}$ W., distant $5\frac{1}{2}$ leagues: the coast between them is low and woody, and may be approached occasionally to 10 or 12 fathoms; but in the night large ships ought not to come under 20 fathoms, from 3 m. off shore. Venloos Inlet is rocky at the entrance, off which a ship may anchor in 12 fathoms, about 2 m. from the shore; but it is little frequented. When abreast of this place the Sugar Loaf, which is the nearest high hill, bears S.W. $\frac{1}{2}$ W. About 5 leagues to the W. of the Sugar Loaf there is a hill called the Gunner's Quoin, 1320 ft. high, and two smaller ones nearer the sea to the W. by N. of Venloos, one called Baron's Cap; the other, nearest the coast, is called the Small Quoin. A shoal of 9 ft. bears N.E. $1\frac{1}{2}$ m. from Venloos Point.

The Coast from Venloos Bay to Foul Point, the S.E. extremity of Trincomalee Bay, is about N.N.W. $\frac{1}{2}$ W., and the distance 12 or $12\frac{1}{2}$ leagues. It is generally low and woody, with steep rocks fronting the sea; but in many places there is a white sandy beach. Ships passing between these places may sometimes meet with overfalls of 2 fathoms at a cast, the bottom being often rocky and uneven; in the night they may steer along in soundings from 18 to 23 fathoms, clear of all danger: with favourable weather, in daylight, the shore may be approached to 15 or 16 fathoms, and in some places to 10 or 12 fathoms. From $2\frac{1}{2}$ to 7 leagues to the S. of Foul Point, a chain of rocky islets lines the shore, some of them more than a mile from it, on which the sea breaks very high in bad weather. The rocky islet called **Providien Island**, lies close to the shore, in lat. $8^{\circ} 0\frac{1}{2}'$ N., lon. $81^{\circ} 33'$ E. Alligator Rock is in lat. $8^{\circ} 20\frac{1}{2}'$ N., being 3 ft. high and $1\frac{1}{2}$ m. off shore. The coast between them is rocky, and forms a bight; being dangerous, from the many rocks above and below water. In about lat. $8^{\circ} 17'$ N. is the S. or Virgel mouth of the Mahavilla Gunga River, the largest river of Ceylon, and off it there are some rocks about 3 ft. above water.

Navigation. Ships bound to the S. parts of the Coromandel coast, or to Trincomalee, should, in the S.W. monsoon, keep near the E. coast of Ceylon in passing from the land about Aganis to the latter place: the land-winds then blow very strong in the night, and frequently in the day, rendering it difficult for a dull-sailing ship to regain the coast if she unexpectedly get far to sea-ward, where the current generally sets to the E. in that season. Near the shore, along the N.E. coast of Ceylon, the current is fluctuating in the S.W. monsoon, generally weak, and sets mostly to the S.

TRINCOMALEE HARBOUR, with its **BAYS**, form a capacious inlet, the entrance to which, between Foul Point on the S.E. and Fort Frederick on the N.W., is $5\frac{1}{2}$ m. wide, contracting, however, to about half that width between Norway Point to the S.E. and Chapel Island on the N.W., when it again suddenly opens, forming Great Bay to the S., and Trincomalee Harbour to the N. To the W. of these, separated from the Harbour by a peninsula, and connected by a narrow passage with the N.W. part of Great Bay, is Lake Tamblegam, which is navigable for boats only

The Harbour, taken in its fullest extent, is about 2 m. each way, indented by numerous bays and coves, and having in it several islands, and many shoals and rocks.

Foul Point, in lat. $8^{\circ} 32' N.$, lon. $81^{\circ} 19' E.$, about 14 m. to the N.W. by N. of Alligator Rock, is the Point that forms the S.E. side of Trincomalee Bay; it has a reef projecting nearly 1 m. to the N. of the Point.

Light. Foul Point has now a light-house, exhibiting at a height of 104 ft. above sea a light, *flashing* every 30 seconds, visible 16 m.; the faint light between the flashes is not visible beyond 10 m. There is another light now on Round Island in the bay, and the old light on Flag-staff Point by Fort Frederick has been discontinued.

When approaching the bay from the N., do not bring Foul Point Light to bear to the E. of S.S.E., to avoid the Diomedea and other shoals. When approaching from the S., and Round Island *fixed* light is seen to the *right*, or N. of Foul Point, do not steer for the Harbour entrance till Round Island bears to the S. of W.S.W.

Flag-staff Point, in lat. $8^{\circ} 35\frac{1}{2}' N.$, and lon. $81^{\circ} 14' E.$, the N. extreme of Fort Frederick, is high, steep-to sea-ward, covered with trees, and has on it several forts. This Point is the N. extremity of the narrow and crooked peninsula that forms the E. side of Trincomalee Harbour, and separates it from Back Bay. This peninsula being steep, bluff land, fronting the sea, is easily known, as the coast is low near the sea, both to the N. and S. The S.E. point of the peninsula, called Chapel Point, has an islet off it called Chapel Island, and to the N.E. a reef of rocks, distant more than $\frac{1}{2}$ m., nearly on the edge of soundings, having 20 and 30 fathoms very close on the E. and S. sides; on the inner part of the reef, one of the rocks, **Chapel Rock**, is seen above water. Flag-staff Point is bold-to, and safe to approach; but, between it and Chapel Point, rocks stretch out from two small projections, nearly one-third of a mile, which ought not to be approached under 14 fathoms.

Elephant Point, the S.W. point of the peninsula, has an island, called Elephant Island, near it on the S.E. side, from which a reef, having 4 ft. water on its shoalest part, with a beacon buoy, projects to the W. Osterberg Point, the W. point of the peninsula, is a little farther to the N.W., between which and Elephant Point there is a cove or safe harbour, with soundings from 5 to 14 fathoms. The entrance of Trincomalee Inner Harbour is $\frac{1}{2}$ m. wide, formed by Osterberg Point to the N. and the Great and Little Sober Islands to the W.; Little Island being the E., and close to the other. About $\frac{1}{2}$ m. S. from Great Sober Island, and 1 m. W. of Elephant Island, is **Clapenburg Island**, close to a point of the same name, forming the W. side of the harbour entrance; and about $\frac{1}{2}$ m. farther to the S. is a point where the land is elevated a little, called Marble Point, with rocks projecting around. This point forms the W. extreme of the Great Bay, separating it from the entrance of the harbour, and affords a mark for going in. To the W. of Marble Point, between it and the entrance of Lake Tamblegam, there is an island called Bird Island; to the S.E. of it lies Pigeon Island, called also Elizabeth Island, distant 1 m., having 10 and 12 fathoms, water, close-to.

Round Island, 50 ft. high, stands nearly $\frac{1}{2}$ m. to E.N.E. of Marble Point, and about $1\frac{1}{2}$ m. to the S. of Elephant Point. This Island (which now has a light-house) is very steep-to on its E. side, having 30 fathoms near it on the outside, then suddenly no ground. In 1859 H.M.S. *Niger* struck on a rock with 4 ft., surrounded by 5 and $3\frac{1}{2}$ fathoms, bearing S.E. by E. $\frac{1}{2}$ E. 4 cables' length from Marble Point, and S.W. $\frac{1}{2}$ S. from Round Island about $\frac{1}{2}$ m. On the S.W. side of this Island there is a rock above water; and another between it and Clapenburg Island, *but nearest the latter*, called Grummet Rock. The entrance leading to the harbour is formed by these islands and rocks to the S.W., and Elephant Island and Point to the N.E.

Light. Round Island, in lat. $8^{\circ} 31' N.$, lon. $81^{\circ} 13' E.$, now exhibits a *fixed* light, visible 10 m.

FOUL POINT, the outer S.E. point of Trincomalee Inlet, bears S.E. $\frac{1}{2}$ E. $6\frac{1}{2}$ m. from Flag-staff Point, and has a reef projecting from it to the N. nearly a mile, with 9 ft. on it. A light-house has now been erected here, exhibiting a *flashing* light, which can be seen 16 or 17 m. off, and is now the principal guide for this place. The coast to the W. is slightly concave to Norway Point, which bears from Foul Point about W.S.W. $2\frac{1}{2}$ m. Between these points, nearly a mile off shore, is *Northesk* Rock. **Great Bay**, forming the S. part of Trincomalee Inlet, is upwards of 5 m. across in its widest part, but not more than $3\frac{1}{2}$ m. between Norway Point on the E. and Marble Point on the W. These are its entrance-points, and lie nearly E. and W. of each other. The centre of Great Bay is very deep, having no bottom at 80 fathoms; soundings, however, are soon obtained on approaching the shore, and varying from 40 to 7 or 8 fathoms. Four rivers, navigable by small boats, fall into the S. part of the Bay, nearly at equal distances from each other. The mouth of the Mahavilla Gunga is 3 m. to S. of Round Island, and the mouth of Lake Tamblegam lies 3 m. to

the N.W. of this river. The bank of soundings, lining the shores of the Bay, extends very little outside the islets or rocks, except at the S.E. part, between the Rivers Cotiar and Sambor, where ships may anchor in 10 or 12 fathoms regular soundings, soft mud, sheltered from E. and S. winds. The E. side of the Bay is bounded by Norway Point to the N., which is W.S.W. of Foul Point: Norway Island lies on the W. side of the Point, having a rocky reef encompassing it, and the islets near it. From this Point and the island a sand-bank stretches more than $1\frac{1}{2}$ m. to the S., with soundings on it 2 to 4 fathoms, and 20 or 25 fathoms close-to: to the W. of it, $\frac{1}{4}$ m. distant, there is no ground; but to the S., between it and the River Sambor, there is good anchorage near the shore. Norway Point and Foul Point must be avoided, on account of the reefs projecting from them about $\frac{1}{2}$ m.: nor should the shore between them be approached, the soundings being irregular, and about half-way there is a very dangerous rock, distant from the shore about a mile, called *Northeast Rock*, from a ship of that name being lost there—it has 9 ft. on it. Close to it, on the outside, are 12 and 14 fathoms, and 7 or 6 fathoms inside. When on it, Flag-staff Point bears N.W. by N., Norway Island S.W., and a hill in the country touching Marble Point W. by S., and Foul Point E. $\frac{1}{4}$ N.

In making the Port of Trincomalee during the months of Oct. and Nov., there is some difficulty from the strong current which sets to the S. at the rate of $2\frac{1}{4}$ or 3 knots; and from the light variable winds, with occasional squalls, and thick weather, which prevail until the N.E. monsoon sets in, about the end of the latter month. Several cases have occurred of vessels of war being swept to the S. during that period, and of not being able to regain their ground for several days. H.M.S. *Melville* was ten days trying to sight the port before she succeeded. Ships, therefore, bound there in Oct. and Nov., or indeed from end of Sept. to the end of March, should endeavour to make the land in about $9^{\circ} 0'$ N., which is 15 m. to the S.S.E. of Molativa Shoal. The coast is there clear, and may be safely approached to 20 fathoms, even by night. If the land be made toward the close of the day, the ship's head should be put to N.N.E. or N.E., and a rate of 3 or 4 knots preserved during the night. Should the wind be N.E., it would be advisable to keep working to windward, and when standing to the N.W. the lead should be kept constantly going, and the ship tacked to the E. as soon as the water is shoaled to 22 or 20 fathoms. At daylight run in for the land on a N.W. or W.N.W. course. Should it be made to the N. of Pigeon Island, a course should be steered to keep outside that island, and not to haul in till the ship has run 3 or 4 m. to the S. of it. She may then steer direct to the Flag-staff Point of Trincomalee. The nearer the point is approached, the more will the influence of the current be avoided: and though the sea-breeze may be very weak, yet a vessel will seldom fail to reach the port. The position of Pigeon Island, and its adjacent rocks and shoals, render the approach to the shore at night, during the above-mentioned period, a task of much anxiety; and as a vessel will naturally close the land as much as safety will permit, great care should be taken in allowing for the constant set of the current to the S.S.E. of at least $2\frac{1}{4}$ knots.

From March to Sept. there is no difficulty in making Trincomalee; the current in the offing sets to the N. but frequently to the S., though it seldom runs more than 1 knot near the shore. Between the lat. of $7^{\circ} 0'$ and $9^{\circ} 30'$ N., the shore may be safely approached to 22 fathoms at night, and to 15 fathoms in the day.

To sail into the Harbour, with a fair or leading wind, a ship may enter the bay, keeping nearly equal distance from each side; when Round Island and Marble Point are discerned, the Point ought to be kept about W. by S. $\frac{1}{4}$ S., open to the N. of that island until the harbour's mouth is open. No soundings will be obtained in the middle of the bay. When Round Island or Elephant Island is approached, she ought to steer in about mid-way between them, and will then have soundings; after hauling to the N.W. for the harbour, care must be taken to give a berth to the reef, stretching from Elephant Island, by not coming under 10 or 12 fathoms towards it. When a ship going into harbour first opens the channel between Elephant Island and the main, she is nearly abreast of that reef; when wide open she is past it. On the hill of Ostenberg Point, there is a battery built with brick on the E. part of the fortification, higher than any battery there, and easily distinguished. The flank of this battery kept on with Elephant Point would carry a ship close to the shoalest part of the reef, where there is only 4 ft.; but the battery kept open with the point, which is the best mark, will carry her clear of it, in not less than 10 fathoms. There are 24 and 30 fathoms between the points that form the entrance of the harbour; and after passing the reef contiguous to Elephant Island, a ship should steer direct for the harbour on about a N.N.W. course. Although narrow, either of the points may be approached within a ship's length; and when through this narrow part, a spacious harbour appears, where a great navy may anchor in good ground, sheltered from all winds, with several coves convenient for careening ships. When within the entrance, it is prudent to steer to the N.N.W. to avoid the shoal within Ostenberg

Point, and York Shoal farther to the N. The former has only 11 ft. water on it; with York Island and Flag-staff Point in one, and Pigeon Island and the low part of Ostenberg Point in one, a ship will be in 5 or 6 fathoms on it, and close to the shoalest part. It is small, with deep water all round; between it and the shore, near Ostenberg Point, there are 7 and 8 fathoms.

York Shoal has only 5 ft. water on its shoalest part, marked by a beacon buoy. To avoid it, a ship in steering up the harbour must keep Round Island a little open with Ostenberg Point; but there seems no good land-mark to point out when a ship is to the N. of it, that she may haul to the N.E. for the merchant-ship anchorage abreast the town. When the *Intrepid's* boat was at anchor on its outer edge in $3\frac{1}{2}$ fathoms, within a ship's length of its shoalest part, Round Island bore S. $\frac{1}{4}$ E., seen over the low part of Ostenberg Point, the centre of York Island N.E. by E. $\frac{1}{4}$ E., and the N.W. point of Great Sober Island nearly W. by S. $\frac{1}{4}$ S. The shoal is not more than half a cable's length from N. to S.; and it is steep all round. Ships may moor abreast the town, to the N.W. of York Island, also to the N. of Great Sober Island, or in any other part of the harbour, clear of the shoals.

In the S.W. arm of the harbour, between Great Sober Island and the point to the N.W. of it called Round Point, there is a rock nearly mid-way, called the **Sister Shoal**, not more than 3 fathoms in diameter, with 9 ft. water on it, and from 7 to 9 fathoms all around. It is not in the way of ships unless they anchor in that part of the harbour to cut wood in the S.W. monsoon. Round Point bears from this rock N. by E. $\frac{1}{4}$ E., and the N.W. point of Great Sober Island S. $\frac{1}{4}$ E. When on it, the middle one of three windows, in a long white barrack on Ostenberg Point, is on with the E. point in sight of Great Sober Island, and a point of land near Clapenburg Cove open about a boat's length with the N.W. point of Great Sober Island.

Clapenburg Point, the E. extreme of Clapenburg Island, lies nearly $1\frac{1}{2}$ m. to N.W. by N. of Round Island. Grummet Rock is to the S. of Clapenburg Island. About 2 cables' lengths to the N.N.E. $\frac{1}{4}$ E. of the Grummet Rock, between it and the outer point of Clapenburg Island, lies the outer part of a ledge, called the Minden Rocks, with only 10 ft. water on it, and 10 fathoms close on the outside; and it may be observed, that all the shoals in the bay, or in the harbour, are generally steep-to.

The Master Attendant recommends ships not to attempt the inner harbour during the night, except under the most favourable circumstances, and having a person on board possessing a local knowledge of the harbour and its entrance.

Working into the Bay with an adverse wind, observe, that when the wind blows strong from W., there is a strong outset from the S. part of the bay, rendering it difficult to work in at times during the S.W. monsoon; ships then bound to Trincomalie generally fall in with the land to the S. of the bay. The reef projecting from Foul Point, about $\frac{1}{2}$ m. to the N.N.W., is not very dangerous, as the depths decrease regularly to 4 and 5 fathoms close to its N.E. verge, and from thence the bank of sounds extends about 2 m. to the N., where 36 and 40 fathoms are got on its N. extremity, with Flag-staff Point bearing W. by N., and Foul Point S. $\frac{1}{4}$ E., the next cast no ground. In passing Foul Point, you may borrow into 14 fathoms; when about a mile to the N. of it, or when Marble Point opens to the N. of Round Island, or with Round Island Light bearing W.S.W., then haul up for Flag-staff Point if the wind permit. For a considerable space between these points, no soundings are obtained in crossing.

To avoid the outset from the bay, work in abreast of Back Bay and Flag-staff Point, which point is safe to approach, close to it the depths being 15 and 16 fathoms. When in with this land, take care, in rounding Chapel Point, on your S. course, to give a berth to the reef stretching from it about $\frac{1}{2}$ m. to the E., having from 30 to 50 fathoms close to it on the S.E. side, and no soundings about $\frac{1}{2}$ m. from it. In coming from the N. towards it, borrow not under 18 or 20 fathoms; but the mark to clear it is a white rock, like the wall of a house, on the inside of the N. point of Back Bay, called Elizabeth Point, kept about a sail's breadth open with Flag-staff Point, till Elephant Island is all seen to the left or S. of Chapel Island. When round Chapel Rock, you may borrow on Chapel Island and the N. shore until past Elephant Island, which are all steep-to, without soundings until very close to the shore, and no danger but what is visible. In standing to the S. towards Great Bay, do not borrow under 20 fathoms towards Northesk Rock, Norway Island, nor any part of the coast between it and Foul Point, where the bottom is rocky with irregular soundings, and Norway Island is surrounded by dangers. It is not advisable to stand farther to the S. than to bring Round Island on with, or just touching Marble Point, until well to the W. of Norway Island; and this mark will carry you clear of all dangers on that shore.

Being to the W. of Norway Island, do not stand too soon to the S., towards the bottom of the bay, on account of the sand-bank, with 3 fathoms on it, extending about a mile to the S.S.W. of

that island, having 15 and 16 fathoms water within half a ship's length of it, and at a small distance no soundings. To pass clear to the W. of this danger, a great tree on the middle of the land forming Flag-staff Point should be kept on with, or just touching Chapel Point, until the small island at the entrance of the lake is open to the S. of Pigeon Island: you will then be clear to the S. of all the dangers of Norway Point. If in standing to the S. the tree open with Chapel Point, tack to the N., to keep it on, or shut in with the Point, until past these dangers.

In approaching the bottom of the bay, the lead must be kept going; for although there are no soundings within a mile of the shore in some places, the first cast may be 35 or 40 fathoms, then 18 or 20, and the next cast probably 10 or 12 fathoms. It would be imprudent to go under 12 or 14 fathoms, as the distance from these depths is not more than 1 or 2 cables' lengths in some places to 4 fathoms, at the distance of $\frac{1}{4}$ or $\frac{1}{2}$ m. off the shore; but to the S. of the bank stretching from Norway Point, in the S.E. corner of the bay, the soundings are more regular, and extend farther out, where ships may anchor, as already observed. In standing to the N. for the entrance of the harbour, you may pass close to Round Island, it being steep-to; from thence you will probably reach the harbour's mouth without tacking, and ought to keep close to the weather-shore in entering it. After being within, anchor on the E. or N. side of Great Sober Island, or where it may be most convenient.

The Back Bay of Trincomalee, on the N. side of the Peninsula, which separates it from Trincomalee Harbour, is about 3 m. wide and 1 m. in depth, bounded by Fort Frederick Flag-staff Point to the S., and Elizabeth Point to the N. The common anchorage is in the S. part of the bay, in from 7 to 10 fathoms sandy bottom, with Flag-staff Point bearing from S. by E. to S.E. by S., distant 1 or $1\frac{1}{2}$ m. The soundings decrease gradually to the sandy beach, except about a mile to the N.W. of the point, where rocks project from the shore to 4 fathoms. Ships may lie securely in this anchorage during the S.W. monsoon, and procure supplies of wood and water. Buffalo beef may be got, but vegetables and other refreshments are scarce. Ships of war sometimes go into the harbour to careen, or to escape the bad weather often experienced on the N.E. coast of Ceylon, and on the Coromandel coast at the early part of the N.E. monsoon; but there being little trade carried on at Trincomalee, it is seldom frequented by merchant ships. Apart from the difficulty of procuring vegetables and other articles of refreshment at Trincomalee, it is generally considered an unhealthy place, being surrounded by low, marshy land. The land-winds are very noxious to Europeans who sleep on shore, exposed to them in the night: many seamen of H. M.'s fleet, under the command of Admiral Hughes, by exposure to these winds, were seized with spasms, which generally ended in speedy death.

To anchor in Back Bay (which ships may safely do between mid-March and mid-Oct.) having brought the Flag-staff Point W.N.W., ships may steer directly for it, rounding it close, and anchoring in 10 fathoms, with it bearing S. by E. Small vessels may anchor in 6 or 7 fathoms, with the point bearing S.E. by E. Ships coming from the N., and wishing to anchor in Back Bay, should not bring Flag-staff Point to bear to the W. of S.; that bearing will lead 2 m. E. of Pigeon Island, and nearly a mile E. of the Lively Rocks. When quite sure of being to the S. of these rocks, ships may bring the Flag-staff S. by E., and anchor as before directed. From Sept. to March, a ship bound into this port should take care not to fall in with the land to the S. of Flag-staff Point, as the currents often run strong to the S. on the E. coast of Ceylon during the N.E. monsoon. On the same coast they are liable to fluctuate in the S.W. monsoon, though it is then prudent to fall in with the land, rather to the S. than to the N. of the port.

Elizabeth Point, which is over 3 m. to N. by W. of Fort Frederick, is the N. extreme of Back Bay. South by E. from Elizabeth Point rather more than 2 m. are several rocks under water projecting from the shore, having 5 and 6 fathoms close to them. Directly to the E. and S.E. of the same point, distant $\frac{1}{2}$ m. to 1 m., two rocks are seen, about the size of a boat, with others under water, projecting from them about $\frac{1}{4}$ m. to sea-ward: these are called the *Lively* and *Heroine* Rocks, having foul ground 7 and 8 fathoms very close to them, and should not be approached nearer than 12 fathoms on the E. side.

A ship abreast of Elizabeth Point and the Lively Rocks, ought not in coasting to the N. to come under 18 fathoms, on account of several sunken rocks between that point and Pigeon Island, which are dangerous to ships making too free with the shore. Two of these rocks bear about N. $\frac{1}{4}$ W. from the Flag-staff Point, and S.S.E. $\frac{1}{4}$ E. from Pigeon Island, nearly mid-way between these places, distant about 2 m. from the shore, and lie near each other. The ship *Fairlie* and H. M. S. *Diomedé* struck on these rocks.

Navigation. A ship leaving Trincomalee, or being abreast of Flag-staff Point in the S.W. monsoon, and bound to the S. part of the Coromandel coast, should keep near the N.E. coast of Ceylon, as the wind frequently hangs far to the W., and blows fresh over the low N. part of the

island. A course about N. by W., if near Flag-staff Point, will be proper, until clear to the N. of Pigeon Island, taking care not to borrow under 22 or 24 fathoms in the night, nor under 20 fathoms in the day, toward that island, or toward the Diomedé and Fairlie Rocks.

Winds and Currents. During the N.E. monsoon, the current frequently sets to the S.W. into Palk Bay, between Point Calymere and Ceylon; ships, therefore, which are bound from the S. part of the Coromandel coast to Trincomalee in this season, should be cautious to keep well to the E. in crossing, to prevent being drifted near the shoals off the N. end of Ceylon. Gales of wind blowing directly upon the shore, are liable to happen in Nov., Dec., or Jan., sometimes making a close approach to the N.E. side of the island dangerous. Several vessels have been driven on shore and wrecked by these gales; but they are not frequent. His Majesty's ship *Sheerness*, and two other ships in Trincomalee Inner Harbour, were driven on shore and wrecked in one of these severe storms. It commenced at sunset, 7th Jan., in a dreadful hurricane at N.W., with heavy rain, and shifted suddenly to N.E., when they parted all their cables and drove on shore.

In Oct. and Nov. the weather is often unsettled, with squalls, rain, light baffling winds, and frequent calms along the N.E. and E. coast of Ceylon, with strong currents running to the S. Ships bound to Trincomalee in these months, or at any time in the N.E. monsoon, should endeavour to get into soundings to the N. of that port, to prevent being carried past it by the currents. In Oct. and Nov. a strong current may always be expected to set along the E. side of the island to the S., when the wind is from the N., or when it is light and variable. Off the Great Bassas it then sets to the S., at times $1\frac{1}{2}$ and 2 m. an hour; at times it is stronger, and follows the direction of the land to the W. as far as Point de Galle, or even to Colombo: this has also been experienced in March, when the winds were faint and variable. When the wind blows strong along the shore on either coast, the current is generally governed by it, and runs strong to the E. along the S. side of the island with the steady winds which prevail in the S.W. monsoon. But in this season, on the E. coast, the winds, although variable, are generally from the land, and a drain of current* often sets to the S. between the Friar's Hood and the Bassas. The high land is often enveloped in clouds, from the great quantity of vapour with which this island is generally covered; and when these clouds are unusually dense, severe squalls blow at times from the land, which require caution, as they give very little warning. These squalls are liable to happen at the changing of the monsoons, or during the strength of the S.W. monsoon.

In the latter end of Feb., or in March, when the force of the N.E. monsoon is abated, there is at times little S. current running along the E. coast of Ceylon; in March it sometimes sets weakly to the N., with a kind of night-and-day winds, similar to land and sea-breezes; ships, should, therefore, after reaching the Bassas in this month, continue to work round the E. side of the island, if the winds are moderate, and the current not strong against them. When they reach the E. part of the coast about Aganis, the winds and currents may be expected to be more favourable for getting to the N. than they are at the S.E. part of the coast about the Bassas. On the S. part of the Coromandel coast, a favourable current setting along shore to the N. is almost certain in part of Feb. and March, with light variable breezes for proceeding up the bay. If N.E. winds be encountered off the S.E. part of Ceylon, a ship may stand to the E. into the open sea, where the wind will most probably become variable to N.W. and W.

PIGEON ISLAND, in lat. $8^{\circ} 43' N.$, lon. $81^{\circ} 19' E.$, bearing about N. by W. $\frac{3}{4}$ W. from Trincomalee Flag-staff Point, distant 8 m., is a rocky island, with a peak about 100 ft. high, with some shrubs on it, encompassed by islets and rocks above and under water, with others between it and the shore, where there is no safe passage except for boats. Although it may be approached to 18 fathoms on the outside, it is advisable to pass at the distance of $1\frac{1}{2}$ or 2 m. from it, in soundings from 21 to 24 fathoms. The bank of soundings between Flag-staff Point and Pigeon Island seldom exceeds 3 or 4 m. distance from the shore, and from the depth of 40 to 42 fathoms it has a steep declivity in most places to no ground. On the N. side of Back Bay, a little inland, there is a hill of a conical form, and another hill to the W. by N. of Pigeon Island, called Mount Erasmus, having on it a tower or pagoda, 310 ft. high; but the land facing the sea is low.

Molewal, or Molateeva House, in lat. $9^{\circ} 16\frac{1}{4}' N.$, lon. $80^{\circ} 49' E.$, stands close to the sea, and bears about N.W. by N. from Pigeon Island, distant $13\frac{1}{4}$ leagues; the coast between them is low, and safe to approach to 18 or 20 fathoms in the night, if the lead is kept going, or to 12 fathoms occasionally, when working in daylight. About $3\frac{1}{4}$ leagues from Pigeon Island there is Red Cross River, and 3 leagues farther to the N.W. is the River Cocklay. From Molewal House, a dangerous coral shoal, having only 6 to 12 ft. water on it, called **Molewal Shoal**, extends to the E. and N.E.

* It has been said of late years that the late Captain Horsburgh did not notice the fact of a S. current along the E. coast of Ceylon during the S.W. monsoon, but the above remark is taken from an edition of this Directory, published in his life time.

near 4 m. from the shore, which ought not to be approached nearer than 13 fathoms. As there are 20 and 21 fathoms, water, about 6 m. from the shore, and 4 or 5 m. to the S.E. of the shoal, a ship should edge out a little when near it; but when abreast of its E. extremity, she may with the land-wind borrow towards it to 13 or 14 fathoms. The N. side of this shoal is not so steep, but is composed of detached knolls, the depths decreasing regularly to 9 or 10 fathoms close to its N. verge, and to 6 and 7 fathoms along the N.W. part close to the shore. From this shoal the coast is low to the N.E. point of Ceylon, with 7 fathoms, water, near the sandy beach; but care is requisite to avoid the following danger.

POINT PEDRO SHOAL encompasses the N.E. extremity of the island, and from thence stretches nearly parallel to the coast about 8 leagues to the S.E., having only $2\frac{1}{2}$ to 4 fathoms on it in many places, and $2\frac{1}{2}$ fathoms on two patches, in lat. $9^{\circ} 50\frac{1}{2}'$ N.: one of these bears nearly E. $\frac{1}{4}$ S. from Point Palmyra, the N.E. extreme of Ceylon, distant about 5 m.; the other, N. $\frac{1}{4}$ E. from the same point, distant 4 m. Between this extensive narrow shoal and the coast there is a safe channel (the *proper* Palk Strait), about $2\frac{1}{2}$ to 3 m. wide, with regular soundings, soft mud, 7 fathoms close to the shore, 7, 8, or 9 fathoms in mid-channel, and 5 or 6 fathoms close to the inner edge of the shoal. To the E. of it the bank of soundings is also flat, with regular depths, decreasing to 5 and 6 fathoms close to the S.E. and E. parts of the shoal, and to 4 fathoms, coarse brown sand, close to its N.E. verge. To clear the S. part of the shoal, Paspy or Mark House in lat. $9^{\circ} 32\frac{1}{2}'$ N., must bear about W.S.W.

The late Captain P. Heywood worked round the S. end of Point Pedro Shoal in H. M. ship *Leopard*, and passed between it and the coast, through the Inner Channel, to Point Pedro village: here he remained some time, and with the assistance of the *Providence* schooner, completed a survey of the shoal and the bank of soundings contiguous to the N. end of Ceylon; which survey had previously been begun and carried on from Molewal Shoal by Mr. Duncan Weir, master of H. M. ship *Suffolk*. The lapse of more than half a century must have made great differences in these shoals, and the Middle Banks of Palk Strait.

To pass inside of Point Pedro Shoal, Captain P. Heywood gave the following instructions:—Ships coming from the S., after passing Molewal Shoal in 12 or 13 fathoms, ought to observe that the coast from thence takes a direction about N.W. by W.; but it is not advisable to haul in for the land nearer than 9 fathoms until in lat. $9^{\circ} 34'$ N., between which and the S. tail of Point Pedro Shoal there are good soundings from 9 to 6 fathoms, the nearer the shore the more regular. Should the wind hang at N.W., making it necessary to beat, come no nearer the tail or inner edge of Pedro Shoal than 6 fathoms; but to the shore you may borrow by distance, as it is steep to all along, with 7 fathoms at the distance of 1 or 2 cables' lengths. If the wind is free when in lat. $9^{\circ} 33'$ N., steer in W., to get sight of the Mark House, which bears S.W. $\frac{1}{4}$ W. from the S. point of Pedro Shoal, and when seen is an excellent mark for entering the channel; but is with difficulty discerned till very near. With this W. course you will carry generally more, but never less, than 6 fathoms close in to the shore, along which you may steer at any convenient distance, as the wind may be, until you raise Palmyra Point, in lat. $9^{\circ} 51'$ N., lon. $80^{\circ} 12'$ E., which is the N.E. point of Ceylon, remarkable by high palmyra trees growing on it, rendering it conspicuous when seen either from the S.E. or N.W. From this point, a small breaking reef projects about $\frac{1}{2}$ m.; the *Leopard* rounded it in 7 fathoms at the distance of $\frac{1}{2}$ m., and anchored in that depth, with the village of Point Pedro bearing about S.S.W., and Palmyra Point S.E. $\frac{1}{4}$ S. The village is between these points, which bear about E. and W. from each other nearly 3 m., Point Pedro being the N.-most part of the island; from hence, the coast extends to the N.W. point of the island W. $\frac{1}{4}$ S. 15 or 16 m. This N. coast of Ceylon is steep-to, with 6 or 7 fathoms, water, close to the shore, between which and the banks there is a fine channel, from 3 or 4 to 9 m. wide, with regular soundings from 7 or 8 to 5 fathoms, over a bottom of blue mud.

Navigation. Ships bound from the E. coast of Ceylon to the Coromandel Coast, after passing Molewal Shoal, may steer along the bank of soundings, taking care not to come under 9 or 10 fathoms in the night, until in lat. $10^{\circ} 0'$ N.; being then clear to the N. of Point Pedro Shoal, they may borrow into 8 or 9 fathoms occasionally, in crossing over to Point Calimere, which bears from Point Palmyra about N.W. $\frac{1}{4}$ N., distant 13 leagues. From 10 to 20, or 25 fathoms, are good depths to preserve, in passing from Molewal Point to Calymere in the S.W. monsoon; the depth will decrease considerably abreast of Point Pedro Shoal, and to the N. of it, in steering a direct course between them; but there is no danger if a ship do not come under 9 or 10 fathoms. If a ship borrow under 15 fathoms, attention to the lead will be requisite in crossing, as the current sometimes sets to the W. in the S.W. monsoon, into Palk Bay. When a ship is bound to Madras, or farther to the N., she need not be particular in borrowing so close to Points Palmyra and Calimere, but it is prudent to keep in soundings, and she ought to be certain to make the coast of

Coromandel well to the S. of her port of destination, for the current frequently sets very strong to N. along that coast in the S.W. monsoon. The current during the S.W. monsoon sometimes sets into the bay between the continent and the N. part of Ceylon, but more frequently in the opposite direction, to the E., rendering it proper to keep within a moderate distance of the land; for a dull-sailing ship happening to round the E. side of Ceylon at a great distance in the strength of the S.W. monsoon would probably not be able to make the coast until to the N. of Madras, which has often been experienced.

PALK BAY, between the continent and the N. part of Ceylon, and named after Governor Palk by the Dutch, is bounded by Adam's Bridge and its contiguous islands to the S., by Calimere Point and the coast of Tanjore to the N. and W., and by the N. part of Ceylon with its islands to the E. The Dutch described *three* channels formed between Calymere Point and the N. end of Ceylon, which lead into Palk Bay: but the S. channel, called **Palk Strait**, contiguous to the N. coast of Ceylon, is probably the only one that may be considered safe for large ships, and even this is only imperfectly known, as the banks are liable to shift, and the W. part of the channel has not been all surveyed.

There are two entrances into Palk Bay from the E.; one between Point Calimere and the N. end of the Middle Banks, having 19 to 24 ft.; the other between the S. end of the same banks and the N. coast of Ceylon, with $5\frac{1}{2}$ to 6 fathoms. All commanders, with a vessel drawing 12 ft., are advised to make use of that to the S., the *proper* Palk Strait, except with a leading wind, or with the aid of steam.

The N. Channel. Paumben Pass bears from Point Calimere about S.W. by S. 73 m. After rounding the spit that stretches off to rather more than a mile E. of the latter place in about $3\frac{1}{2}$ fathoms, 3 m. off shore, small vessels may stand S.W. $\frac{1}{2}$ S., keeping in $3\frac{1}{2}$ to 4 fathoms till two large detached Palmyra-trees to the W. bear about N. She is then clear of the banks. This channel, through the centre of which the above directions lead, is 3 m. wide, having a small sandy knoll, with only $2\frac{1}{2}$ fathoms on it, about a mile inside its S. boundary, and 4 m. S.S.E. of the point. The depths on each side vary from 2 to 3 fathoms, with a bottom of hard sand, while that of the channel itself is mostly mud.

The Middle Banks from the above channel stretch in a S. direction to within 8 m. of the Ceylon coast, having an average breadth of 3 m., with uneven soundings of 2 to $3\frac{1}{2}$ fathoms, and in one place only 9 ft. This spot is situated $8\frac{1}{2}$ m. nearly S.S.E. from Point Calimere, and $9\frac{1}{2}$ m. S.E. from the two remarkable trees already noticed. It is composed of hard fine sand, and should be carefully avoided. There is always what is called a *swash* over these banks, which renders it hazardous to be on them in an open boat during a breeze.

In the N.E. monsoon a vessel bound against it should work up on the Ceylon side as far as Kayts, when she may stand over to the coast of India, and creep to windward in smooth water. With the strong currents ever attendant on the monsoons in the middle of the Bay, it is impossible to contend against them without thus taking advantage of smooth water and weather-shores.

The S. Channel. In beating into the Bay against the S.W. monsoon, a vessel should stand over to the N. coast of Ceylon, and work down to the island of Delft (Nedaantevo), whence a stretch may be made across the Bay to its W. side, where land and sea-breezes will be met with, accompanied by smooth water. The well-known Pedro Shoal extends from 20 m. S.E. of Point Pedro to about 6 or 7 m. N.W. of it, and even joins to the Middle Banks; but this N. part of it has not been thoroughly examined, though known to have patches with 4 fathoms in some places. There is a good channel of $2\frac{1}{2}$ to 3 m., with 7, 8, and 9 fathoms, mud, between it and the shore. The most dangerous part on its N. end bears from the point about E. to E.S.E. 4 m. off shore. It has in some parts as little as $2\frac{1}{2}$ fathoms, and a vessel in passing it ought not to shoal her water on the bank to less than 6 fathoms, when she will be about 3 m. off shore, with deep water inside. Inside this, a vessel working to the W. may approach the shore with safety to within $\frac{1}{2}$ m., carrying from 6 to 8 fathoms, sand and mud, till abreast of Kangeserong, which may be known from its two bungalows, each built on a rocky platform washed by the sea. To avoid some foul ground, which reaches from the beach at this place to a distance of 2 m. from shore, a little further W., she must now be careful not to shoal her water to less than 6 fathoms on her in-shore tack, or to less than 5 on her N. or off-shore board, as the S. end of the Middle Banks, with $2\frac{1}{2}$ and 3 fathoms over it, lies to the N. The channel is 6 m. broad from the foul ground to the end of the banks, with $5\frac{1}{2}$ to 8 fathoms, sand and mud in it; when the opening between Karatevo (Amsterdam Island) and the main bears due S., the foul ground is passed, but then there is shoal water (with patches of $3\frac{1}{2}$ and $4\frac{1}{2}$ fathoms) extending as far as has been surveyed to the N.W. of Karatevo. Great caution is necessary in a large ship when passing over this space, and the lead must be kept

going. A vessel can then shape a course to any part of the bay, having good anchorage in 4 to 5 fathoms $\frac{1}{2}$ to $\frac{3}{4}$ m. outside any of the islands. Following these directions, a vessel from Point Pedro ought not to shoal her water to less than 4 fathoms, but more generally have a depth from 5 to 6 fathoms.

If bound to Jaffna, she should, after passing Kayts, stand to the S., rounding Elwateevo, Anellateevo, and Namateevo, at a distance of 1 to 2 m., till within 2 or 3 m. of Nedaenteevo (Delft), which she will make ahead. She may then steer more to E., keeping about a mile from Tomgrateevo, and taking care not to haul to the N. of E. till that island has been left 4 or 5 m. behind, or till Calmaene Point bears about N.E. by E. A small vessel, having Calmaene Point E. by N. to N.E., may steer for it till she opens Jaffna Fort Church clear of the island of Nandateevo, when she can stand freely for the opening, carrying from 4 to $2\frac{1}{2}$ fathoms over a rocky ledge, to $2\frac{1}{2}$ and 3 fathoms inside on sand, and anchor with the following bearings:—Calmaene Point E., Fort Church about N. by W.; but care must be taken not to approach Calmaene Point within 600 or 700 yards, as there are some rocky heads some distance from it.

The anchorage for a large vessel is outside the rocky ledge, with the Fort Church bearing N. by E. over the centre of a small island called Small Fox Island, just clear of the small Cocoonut Tope on Mandetevo and Calmaene Point N.E. by E.; she would then be in $4\frac{1}{2}$ fathoms, sand, about 2 m. off the islands. It must be borne in mind, however, that this anchorage ought not to be used from the middle of May to the middle of Aug., when the S.W. monsoon, from which there is no shelter, blows with great violence.

A rock was supposed to exist in the approach to Jafnapatam from the W.; but after a careful examination, no such danger could be discovered; and although some pilots declare that it is still there, they are unable to point out the precise spot. This, added to the testimony of some divers, who declare that they never met with it, although employed in the neighbourhood from childhood, may lead us safely to infer that the pilots are in error, and that no impediment is offered to the safe navigation of this part of the coast.

If bound to Kayts. No vessel, drawing more than 8 ft., should attempt to enter the harbour; for although there are $7\frac{1}{2}$ ft. in the channel at L. W. springs, the greatest rise is not more than 15 in. To avoid the foul ground extending $1\frac{1}{2}$ m. to the W. of the N.W. end of Karateevo, a vessel ought to keep in 5 fathoms till Elwateevo bears S. by W.; she may then stand for that island, shoaling her water to 3 fathoms till Fort Hamenhiel (built on a rock, at the N. side of the entrance), bears S.E. by S., when she can steer for it, keeping the Custom-house Point, on which is a large clumpy tree, over the low sandy point of Karateevo, till within $\frac{1}{2}$ m. She will now be in 9 ft. smooth water, and keeping more to the S., may round the fort at the distance from 200 to 700 yards, according to circumstances, care being taken when inside to borrow over on the N. side of the harbour till past an old bungalow on that side. Any anchorage may then be selected, but the best is off the Custom-house, in 11 or 12 ft., mud. Outside good anchorage is obtained in either monsoon, in 13 or 14 ft. smooth water, with the fort bearing S.E. $1\frac{1}{2}$ m., the N. end of Elwateevo S.W. $\frac{1}{2}$ m., and the N.W. end of Amsterdam Island N.E. In the S.W. monsoon the bank of Elwateevo may be approached a little closer, and in the N.E. monsoon, she may go nearer the foul ground off Amsterdam, which will give a vessel more room for weighing. Large vessels should, of course, anchor farther out.

MADRAS, OR COROMANDEL COAST.

We commence a description of this coast with the Paumben Pass and the Indian shore from that place to Point Calimere. The **Madura coast** extends from Tonitory to Kottipatnam, in lat. $9^{\circ} 58' N.$, and lon. $79^{\circ} 15' E.$, just to the N. of which a narrow sand-bank projects off shore 13 m. to the E., which may be said to mark the boundary between the Madura and Tanjore districts. The **Tanjore coast** extends from Kottipatnam round Point Calimere and beyond Negapatam.

The **Paumben Pass** N. entrance lies nearly 6 m. to the W. of the Great Ramiseram Temple, and about 1 m. to the W. of Paumben light-house. Some account of it has been given in the preceding chapter, which describes the Gulf of Manar. Vessels drawing more than 12 ft. cannot pass through yet, but the approach on the N. side is clear of all obstructions to navigation. **Paumben Light**, in lat. $9^{\circ} 17' N.$, lon. $79^{\circ} 12' E.$, is *fixed*, 97 ft. above sea, and visible 12 m. off. Its column is circular, and about 50 ft. high. The light may be steered for on any bearing between S.W. and S.E., but the Pass must only be entered by daylight, and a Government pilot must be taken.

Tonitory or Tonitorai Point, about 2 m. to the W. of Paumben Light, is the E. extreme of the **Ramnad promontory** (the E. portion of Madura), the coast of which hence trends to W. by N. and W.N.W., for some 12 m., to the mouth of Vigay river and Autankurry town; and thence

round N.W. to Devipatnam, whence the Madura coast takes a general direction of N.N.E. to Kottipatnam, beyond which the Tanjore coast curves round by the N. and E. to Calimere. The principal towns on this coast are Devipatnam, Tondy, Minbesel, and Kottipatnam, in the province of Madura; and Adrampatam, in Tanjore, in lat. $10^{\circ} 20' N.$, and lon. $79^{\circ} 20' E.$, from which town to Point Calimere (a distance of 28 m.) there is only one small fishing village, that part of the coast being very low, and intersected by numerous small creeks and rivulets, which overflow the country for a considerable distance from the sea. The entrance of Muttupettai, the largest of these rivulets, is 19 m. W. of Point Calimere, and off it there is a mud flat, on which was found only 3 ft. water at low tides. This and the other creeks communicate with an extensive back-water, which is only navigable by the smallest description of trading boats. From the town of Adrampatam to Tonitory the whole coast is thickly populated, principally by Hindoos and a few Mahomedan traders.

The coast is low and sandy, some parts are well cultivated with grain, and in the vicinity of towns and villages there are extensive groves of cocoa-nut trees, but the principal produce is salt, which is procured from salt pans on the banks of creeks that intersect the whole coast. In all the towns and many villages there are remains of large temples and some fine choultries; the latter are still kept in tolerable repair for travellers. At the village of Shalavanaikapatnam there is a splendid column erected in the middle of a small fort, both of which were built by the Rajah of Tanjore, in 1814, to commemorate the victories gained by British troops over those of France.

The soundings along this coast are regular, there being $4\frac{1}{2}$ and 5 fathoms at the distance of 6 m. off shore, from thence it shoals gradually to the beach. There is a narrow sand bank, extending 13 m. off shore, from a low point, in lat. $10^{\circ} 2' N.$, lon. $79^{\circ} 19' E.$, on which there is only 1 and 2 fathoms water. In passing this part of the coast a vessel ought to be kept out in 6 fathoms, which would take her clear of the bank. There is a small rocky patch, with only 2 fathoms on it, due S. of the bungalows on Point Calimere; by keeping in a line of soundings of $3\frac{1}{2}$ to 4 fathoms, about 3 m. off shore, a vessel would pass outside of these rocks and foul ground off the point, and inside the N.E. boundary of the outer reefs; the channel between these dangers is $1\frac{1}{2}$ m. wide, with from 3 to $4\frac{1}{2}$ fathoms water in it. Off the extreme point of Calimere there is a sand-bank that extends 1 m. off shore, on which the sea beats very heavily; this bank affords tolerably good shelter to the trading boats in blowing weather.

Winds and Weather. In the Gulf of Manaar and Palk Bay the S.W. winds generally commence about mid-April, with fine clear weather; and early in May the monsoon blows fresh, and continues until mid-Aug., when it moderates, and gradually dies away about the end of Sept.; the sky then begins to be overcast with dark clouds, and about the 10th of Oct. the N.E. monsoon commences, with hard squalls from all quarters, accompanied by heavy rain, thunder, and lightning; this weather continues during the month, the wind then becomes steady from N.E., but during the months of Nov., Dec., and Jan., there are frequent gales and much rain. In the early part of Feb. the N.E. winds take off, and regular sea and land-breezes set in, which continue until mid-March, when calms prevail for several days, and the weather becomes very warm, until the return of the S.W. winds in April.

Navigation. A ship being in 18 or 20 fathoms water, abreast of Point Pedro Shoal, and bound to Negapatam in the S.W. monsoon, should steer N.W. by N. 8 or 10 leagues, taking care to keep in soundings; if the water deepens after having run a few leagues to the N. of the head of the shoal, she ought to haul more to the W., and keep in from 12 to 16 fathoms; for the wind often draws to W. or to N.N.W., with a strong current sometimes running to the N. rendering it difficult to get near the land between Point Calimere and Negapatam, when a ship is far out in the offing. In the S.W. monsoon the currents on the E. coast of Ceylon, from 40 to 50 m. off shore, set mostly to the S. or S.S.E., according to the direction of the land. If passing in sight of the low land about Calimere Point, a large ship should not come under 6 or 7 fathoms towards the shoal flat projecting from that point, and you will in this depth pass the point at the distance of $2\frac{1}{2}$ or 3 leagues. Steer afterwards along the coast in 8 fathoms, which will lead outside the 3 fathoms' shoal, situated to the S. of Negapatam; and when the white house, which is about 5 m. to the S. of that place, bears to the S. of W., you are clear of its N. extreme, and may haul in for the road, and anchor in 5 or $5\frac{1}{2}$ fathoms.

CALIMERE or CALYMERE POINT (the beacon) in lat. $10^{\circ} 18' N.$, lon. $79^{\circ} 52\frac{1}{2}' E.$, is low, covered at high tides, and not to be approached under $5\frac{1}{2}$ or 6 fathoms; the two pagodas, called Point Calimere Pagodas, in lat. $10^{\circ} 22\frac{1}{2}' N.$, lon. $79^{\circ} 51\frac{1}{2}' E.$, stand E. and W. of each other, about 1 m. inland, and $5\frac{1}{2}$ m. to the N.N.W. of the beacon on the point. From these pagodas the direction of the coast is about N. $\frac{1}{2}$ W. to Negapatam, distance 20 m.; all the land in this space is low, and planted with cocoa-nut trees near the sea. In lat. $10^{\circ} 28\frac{1}{2}' N.$, about 6 m. to the N. of the two pagodas, there is a remarkably tall cocoa-nut tree by itself, and 3 m. farther a *tuft* of the

same trees much higher than the rest, which bears W. from the S. end of Negapatam Shoal. In lat. $10^{\circ} 36' N.$, about 5 m. to the N. of the tuft of trees last mentioned, there is a clump of thick bushes, or small trees, a little elevated, which is the first thing seen in making the land from the S.E.: and it rises in the form of a saddle, when viewed from 17 or 18 fathoms water, 5 or 6 leagues off shore. This *saddle-bush* is at a small distance from the sea, and about $1\frac{1}{2}$ m. to the S.S.W. of a sand-hill near the beach, which has on it some cocoa-nut trees, and bears due W. from the N. end of Negapatam Shoal; close to the sand-hill, on the N. side, a *white* house is perceived among the trees near the beach, which is also a mark for the N. end of the shoal.

Negapatam Shoal extends nearly N. and S. about $6\frac{1}{2}$ or 7 m., and is little more than 2 cables' lengths across on any part; it is composed of hard sand and stones, having from 24 ft. on its S. part to 19 ft. at its N. part. About mid-channel between it and the shore, the depths are from $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms, and 5 fathoms close to its inner edge. The S. end of the shoal is distant from the beach about 3 m., and the N. end about 4 m. The depths close to the shoal on the outside are 6 and 7 fathoms; therefore, a ship bound to the N. ought not to come under $7\frac{1}{2}$ fathoms until to the N. of the sand-hill and white house among the trees near the beach, or until Negapatam flag-staff, or the black Pagoda bears N.W. $\frac{1}{2}$ W., or N.W. by W.; she may then haul in, over some knolls that lie near the head of the shoal, and if the flag-staff bear to the N. of N.W. $\frac{1}{2}$ W., will have overfalls of 7 to 5 fathoms on them. From 21 ft. water on the N. point of the shoal, Negapatam flag-staff bears N.W. distant 8 m., and the sand-hill about W. The 3-fathoms patch of Negapatam Shoal is in lat. $10^{\circ} 36' N.$, abreast of the *saddle-bush*, above noticed.

The Anchorage at Negapatam during the fair season is in 5 or $5\frac{1}{2}$ fathoms, soft ground, with the flag-staff about W. or W. by S., off shore $1\frac{1}{2}$ or 2 m. When the weather is unsettled, ships should anchor out in 6 or 7 fathoms, with the flag-staff W. $\frac{1}{2}$ S., and the highest of the five pagodas N.W., good holding-ground. Fresh provisions for present use may be obtained, with vegetables, fruit and rice; but fire-wood is scarce. The watering-place is at a great tank, about $\frac{1}{2}$ m. up the river. Ships generally employ the country boats to bring off water, as it might be dangerous to use their own, on account of the surf, which breaks high on the bar with any swell. The rise of tide on the springs is about 3 ft.; H. W. about 5 h. on F. and C. of moon.

NEGAPATAM (the Fort) is in lat. $10^{\circ} 46' N.$, lon. $79^{\circ} 50' E.$ The town lies to the N. of the Fort, near the entrance of a little river capable of receiving small country vessels, which has a N. and S. entrance, the land between them being an island; the boats use the windward entrance in passing out, and the leeward one in returning, according to the monsoon. The bar is tolerably smooth in fine weather, when ships' boats may go over it into the river; but they cannot land anywhere else, on account of the surf. A considerable trade is carried on at this place by small coasting vessels; and, as it is now the terminus of the Great Southern India Railway, a good number of ships and steamers make use of this roadstead. An Act passed in 1867 by the Madras Government, decrees that "The ports of Negapatam and Nagore shall be treated as one and the same port; every vessel, in respect of which port-dues shall have been charged and taken at one of the said ports, being exempted from the charge of entering the other port." About $1\frac{1}{2}$ m. N.N.W. from the Fort, stands the old *Black Pagoda*, which is one of the most conspicuous objects in approaching this part of the coast, the whole of it having a low, drowned aspect when first seen from the offing, and is mostly a sandy, barren soil, planted with cocoa-nut trees in many places.

Light. Negapatam now shows a *fixed* light on a white tower, at 82 ft. above sea, and visible 12 m. off, in lat. $10^{\circ} 46' N.$, lon. $79^{\circ} 50' E.$

Nagore five White Pagodas are in lat. $10^{\circ} 49' N.$, distant about 4 m. from Negapatam, or 3 m. from the *Black Pagoda*, the direction of the coast between them being nearly N. These *White Pagodas* are excellent sea-marks for distinguishing Nagore River, which is close to them on the N. side, and where a great trade is carried on in piece-goods, rice, &c. There are 8 ft. on the bar at H. W. during the springs; the rise of tide about 3 ft., and it flows to $8\frac{1}{2}$ h. Several vessels of 200 and 300 tons burthen belong to this place, and are navigated by natives, who conduct them to the coast of Sumatra, Acheen, Malacca Strait, and other parts on the E. side of the Bay of Bengal, where they have a constant trade. The anchorage in the road is 2 or 3 m. off the entrance of the river, in 5 or 6 fathoms, with the five *White Pagodas* W.S.W. or W. by S. The coast is low, and at times inundated near the mouth of the river.

Karikal, or Caricall, a small French settlement subordinate to Pondicherry, about 10 m. to the N. of Negapatam, and about 2 leagues from Tranquebar, may be known by a bushy tree near it. Ships may anchor abreast this river in 5 or 6 fathoms; but the entrance is not easily perceived, being formed by a narrow point of sand extending along the coast; the opening is to the N., nearly parallel to it, which is the case with most of the rivers hereabout. To the S. of Karikal River about a mile, is Coluncherry River; and between this and Nagore is Tiroomale River: the bars at the mouths of

these small rivers render them navigable only at H. W. by boats, or small country vessels called *chilingas*.

Light. On Karikal Flag-staff, in lat. $10^{\circ} 55' N.$, lon. $79^{\circ} 50' E.$, a *fixed* light is now shown, 65 ft. above H. W., and visible 8 m.

TRANQUEBAR, in lat. $11^{\circ} 1' N.$, lon. $79^{\circ} 51' E.$, bears about N. from Nagore, distant about 4 leagues; and is easily known, by the fort and houses having a neat appearance, and being generally very white. In coasting along from Negapatam to Tranquebar, the shore may be approached to 6 fathoms; the depths are 5 fathoms about 2 m. off, 7 fathoms about 3 m., and 12 fathoms about 6 m. off shore. In passing the river at Tranquebar, a ship ought not to come under 6 or 7 fathoms, on account of a bank projecting to a small distance from the shore. From Tranquebar, the coast extends nearly N. about 7 leagues, to the entrance of Coleroon River, and may be approached to 6 or 7 fathoms, regular soundings; but 10 or 11 fathoms are good depths to preserve in coasting along. To the N. of Tranquebar, at 2 leagues' distance, lies the village Caverypatam, in lat. $11^{\circ} 8' N.$, close to the mouth of the river called New Cavery, and near it two small pagodas stand at a little distance from the sea.

The small river Trimul-vassel, taking its name from a pagoda that is seen inland, is about 2 leagues to the N. of Caverypatam, having a bank stretching nearly a mile from its mouth; but as the depth in the approach to it gradually decreases, it is not dangerous. The land to the N. of this river is rather higher than the coast to the S., which from Point Calimere is all very low, and only discerned from the offing by the trees and buildings. On the S. part of the coast, the bank of soundings is very flat to 20 fathoms about 5 m. off; but from 70 fathoms about 8 or $8\frac{1}{2}$ leagues from the land, it has a steep declivity to no ground, 100 fathoms. To the N. of Nagore soundings do not extend so far out, the depths from thence being generally 40 or 45 fathoms about $5\frac{1}{2}$ or 6 leagues off shore, and the bank shelves suddenly, from 45 or 50 fathoms to no ground.

Coleroon River, in lat. $11^{\circ} 29' N.$, has within the entrance a small island, with the Fort of Devicotta, and may be known in coming from the S. by the land terminating in a point on the S. side the river, the direction of which being first N., from thence turns to N.N.W. and N.W. by N. about 3 leagues, to Porto-Novo, forming a kind of bay. But the best mark to know this place is a thick plantation of trees near the sea, called Coleroon Wood, which is higher than the other land, and when first seen from sea, appears like a low, level island, sloping towards each extreme. Inland are situated four remarkable buildings, called the Chalambram Pagodas; when just touching the S. part of Coleroon Wood, they bear W. $\frac{1}{2}$ N.; when on the middle of it they bear W.; but will not be perceived if a ship is well in shore, until they open to the N. of the wood, bearing then W. by S. $\frac{1}{2}$ S.

Kodiampalayem, in lat. $11^{\circ} 22' N.$, is a village near the mouth of Coleroon River, and is the N.-most port of Tanjore district. Then commences the district of South Arcot, which extends to Covelong; beyond that to Pulicat is the district of Madras.

COLEROON SHOAL projects 5 m. to N. from the river entrance, and stretching to the S., joins the shore about the S. part of Coleroon Wood; the inner part of it is dry at L. W., and from 11 to 12 fathoms near the outer edge, it is steep to 3 or 4 fathoms. A large ship, in coasting along here, should not come under 15 fathoms in the night, nor under 12 or 13 fathoms in the day, toward this dangerous shoal. H.M.S. *Falmouth*, standing in towards the shoal in the night, intending to tack in 12 fathoms, but missing stays, got into $4\frac{1}{2}$ fathoms, and was obliged to anchor; the weather being moderate, they warped out in the morning and made sail. It may be observed that the water shoals more suddenly in standing towards the shore about Coleroon than at any other part of the coast. When the S. Chalambram Pagoda is on with the S. part of Coleroon Wood, you are abreast the S. end of the Shoal, which does not extend far out. When the two middle Pagodas are in one, bearing W.S.W., and Porto-Novo flag-staff W. by N. $\frac{1}{2}$ N., a ship will be in 12 fathoms, near the N. end of the Shoal, which is here nearly 3 m. distant from the shore; but a ship bound into Porto-Novo should bring the flag-staff W. by N., when the two middle Chalambram Pagodas are bearing W.S.W. $\frac{1}{2}$ S., she will then be clear of the N. end of the shoal, and may haul in for the Road; or if in 18 or 20 fathoms, she may haul in for it, when the flag-staff bears W.N.W.

Porto-Novo, in about lat. $11^{\circ} 30' N.$, and 3 leagues N.N.W. of Coleroon River, is a place of some trade, and the road affords good anchorage in S. winds, being sheltered from these by Coleroon Shoal, which breaks the swell. Ships may anchor in 6 fathoms, mud, good holding-ground, with the S. Chalambram Pagoda S.W. $\frac{1}{2}$ W., and Porto-Novo flag-staff W. $\frac{1}{2}$ N., off shore 2 m. The river is small, navigable only by boats and country vessels. Water is procured from a tank a little way up, but it is brackish, and of a pernicious quality. There is an iron-foundry here, the light from which, it is thought, may sometimes be mistaken for the light at Pondicherry. (*See* remarks on Pondicherry.)

Cuddalore Town and River, in lat. $11^{\circ} 48' N.$, lon. $79^{\circ} 46' E.$, bears from Porto-Novo nearly N. by E., distant about 8 leagues; the coast is safe to approach to 7, 8, or 9 fathoms, from 2 to 3 m. off shore. A little to the N. of Porto-Novo begin white sand-hills near the sea, which extend along shore, and from the offing appear like islands, being higher than the adjacent coast. The anchorage at Cuddalore is in 5 or 6 fathoms, good ground, with the flag-staff N.W. by N. to N.W. $\frac{1}{2}$ N., and the first tuft of trees to the N. of the bar N.W. by W., when the back-water or river will be distinctly seen; and the flag-staff will appear between two high, sandy hillocks, but rather nearer the S. one, and the white building and church in the centre between the S. sandy hillock and the tuft of trees at the bar. The river is small, shut up by a bar at the entrance, and navigable only by boats. Water, fresh provisions, vegetables, fruit, and other refreshments, are got at this place. The ruins of **Fort St. David** lie 2 or 3 m. to the N. of Cuddalore, from which a bank projects a little more than $\frac{1}{2}$ m. to sea-ward. From Cuddalore to Pondicherry the coast extends about N. by E. 5 leagues, being low and sandy near the sea, and may be approached with safety to 8 or 9 fathoms, the soundings decreasing regularly to 7 fathoms about 1 or $1\frac{1}{4}$ m. off shore. From 42 or 45 fathoms, about 6 leagues from the land, the bank has a steep declivity to no soundings. In coasting along from Point Calimere to Pondicherry, a ship may at discretion keep in soundings between 10 and 14 fathoms; except when passing Coleroon Shoal, she ought not to come under 13 or 14 fathoms. Captain Driver, of the ship *Clyde*, states that he got into shoal soundings on a bank off Cuddalore: having made the land off Porto-Novo, and steering occasionally N.N.E. along the coast, in 12 and 13 fathoms, shoals suddenly to 5 fathoms, and had many casts from 5 to $6\frac{1}{2}$ fathoms, then hauled more off, and soon deepened.

PONDICHERRY, in lat. $11^{\circ} 56' N.$, lon. $79^{\circ} 50' E.$, is situated close to the sea, and easily distinguished by its numerous buildings, having an agreeable aspect when viewed from sea-ward. To the N.W. of the town, on a long, flat hill, there is a piece of remarkable black land at a small distance in the country, having on it a grove or tuft of trees, which is the first thing discerned in approaching this part of the coast, and is a good mark to know Pondicherry. There is a small river, into which the country boats and small vessels enter, when trading to this place. In the fair-weather season, from Jan. to Oct., the common anchorage in the road is abreast the town, in 7 or 8 fathoms, about $\frac{3}{4}$ m. from it; small ships may moor in $5\frac{1}{2}$ or 6 fathoms; but during the season when stormy weather may be apprehended, it is prudent to anchor well out, in 12 or 14 fathoms, in what is called the outer road.

Light. A *fixed* light has been established in the square since 1836. It is exhibited all night, 131 ft. above sea level, and may be seen, in clear weather, 14 m. During the N.E. monsoon, that is from Oct. to March, vessels arriving in the night may find good and convenient anchorage in 10 or 12 fathoms, with the light bearing by compass from W. to W.N.W. During the S.W. monsoon, from March to Oct., bad weather is not to be apprehended, and vessels may then anchor at night in 6 or 7 fathoms, with the light bearing by compass from W. to W, by N. The positions for anchoring, here recommended, are those which, in the respective seasons, will be found most convenient for communication with the shore.

Caution. The light from the chimney of an iron-foundry at Porto-Novo, 10 leagues to the S., may sometimes be mistaken for Pondicherry Light; an error which might be productive of disastrous consequences. In clear weather the distinction between the two lights would be sufficiently obvious, from the foundry light changing its brilliancy at the time of feeding the furnaces; but in hazy weather this change might be attributed to the variable state of the atmosphere; in which case the soundings must determine the position of the ship. A vessel from the S., and bound for Pondicherry, being in doubt respecting the light seen on the coast, should immediately be put under easy sail, and keeping in readiness to manœuvre, stand in shore when the wind will permit, and endeavour to make out the light. The lead should be kept constantly going in order to receive due warning when to stand off; this being especially necessary near Coleroon, where the water shoals suddenly. In crossing the Coleroon Bank, the bottom is sandy and good for anchorage, should the wind from the sea not be too fresh. There is not sufficient depth of water on some parts of the bank for large ships, and although by bringing either light on a bearing about N.W. by W., all danger is avoided as far as grounding is concerned; yet there would be reason to fear that if a ship was off Pondicherry, the wind would not permit her to lay up sufficiently soon for the road, particularly in the S.W. monsoon, and that she would find herself past it, or at least obliged to anchor too far to the N., and in a position very inconvenient for receiving or discharging cargo, or for communicating with the shore.

The coast, from Pondicherry to Sadras, is 15 leagues, and the direction nearly N.N.E.; but the mouth of the Palar river is more prominent than any other part, and bears N.N.E. $\frac{1}{2}$ E. from Pondicherry. The shore is in general low, with sand-hills in some places fronting the sea; from

10 to 14 and 15 fathoms are good depths to keep, in sailing between these places. From 42 or 45 fathoms, about 5 or 6 leagues off shore, the bank shelves suddenly to no ground. The bottom is mostly sand or gravel in the offing. **Conjimeer**, or **Coonemode**, a small river, where there are some ruins of buildings, is distant about $4\frac{1}{2}$ leagues N.N.E. from Pondicherry; between them sand-hills extend along the coast; and behind these, the black land from the back of Pondicherry, gradually decreasing, terminates about 1 m. to the S. of Conjimeer. Abreast of this place the anchorage is good in 6 to 8 fathoms, about $1\frac{1}{2}$ or 2 m. off shore. **Mercanum**, in lat. $12^{\circ} 12' N.$, a place of salt manufacture, having a good road into the interior, is on a back-water about midway between Pondicherry and the Palar river. **Alemparva**, in lat. $12^{\circ} 16' N.$, bears nearly N.N.E. $\frac{1}{2}$ E. from Conjimeer, about 3 leagues; a thick wood and a village are perceived, from whence to the S. point of Alemparva river, which projects a little into the sea, the coast is rather low. The N. side of the river is covered with trees, and several small hills appear in the country.

Palar River Mouth, in lat. $12^{\circ} 27' N.$, bearing N.N.E. $\frac{1}{2}$ E. from Alemparva Fort, has its source in the Mysore country, and it flows past Arcot and Chingleput to the sea, about 4 m. to the S. of Sadras, where it forms a prominent part of the coast; its entrance is contracted by a bar, or narrow ridge of sand, inside of which the river becomes of considerable width.

SADRAS, in lat. $12^{\circ} 32' N.$, lon. $80^{\circ} 10' E.$, bears from the entrance of the small river Alemparva N.N.E. $6\frac{1}{2}$ leagues; the coast between them is generally barren, with some sand-hills; and few trees appear till within 3 leagues of the former place, where is the S. extremity of a thick wood of Palmyra-trees, extending about a league along shore to the N. Abreast of this wood, the shore being more flat than to the N. or S., a ship in passing should edge out a little, into 11 or 12 fathoms. There is another wood about 5 or 6 m. to the N. of the former, which appears to project in a point when viewed from the S. From abreast the S. part of this wood, the flag-staff of Sadras may be perceived over the trees that hide the town; for this place is not easily discerned from the sea, on account of the trees with which it is surrounded. Two pagodas may be seen in passing, one to the S., the other to the N.; but they are not very conspicuous. This part of the coast is known from sea-ward by a ridge of hills inland, at the back of Sadras, some of which are very rugged; and this ridge is generally called the High Land of Sadras, or Sadras Hills. When the highest of these bears N.W., the town of Sadras is nearly abreast.

The coast from Sadras to Madras, extending N. by E., and N. $\frac{1}{2}$ E., about 11 leagues, is generally low and woody near the sea; but inland there are high hills. In coasting along, from 12 to 17 or 20 fathoms are good depths to preserve. Come not under 12 or 14 fathoms in a large ship, particularly in the night, when to the N. of the Seven Pagodas, on account of the reef of Tripaloor. On this part of the coast, the bank, as before, has a sudden declivity, from 40 to 45 fathoms, sand or gravel, about 5 or 6 leagues off shore, to no ground. About 3 or 4 m. off shore at Sadras, the depths are 9 and 10 fathoms, but to the N. of that place the coast becomes more steep, those depths being about 2 or 3 m. off.

The **Seven Pagodas of Muliveram**, about 7 m. to the N. of Sadras, are not discernible except when well in with the land: two of them are near the sea, one of which, standing on a rock, is washed by it, and is now nearly destroyed, although this pagoda, *it is said*, formerly stood at a considerable distance inland, the sea having encroached greatly on the land; four of them are in the valley near the foot of the S. high land, and the other on its extreme point: the view of those in the valley is often intercepted by the woods, particularly when they bear to the W. From the Seven Pagodas to Covelong, the coast extends N. by E. $\frac{1}{2}$ E., about $3\frac{1}{2}$ leagues; between them **Tripaloor Rocky Shoal**, in lat. $12^{\circ} 37' N.$, projects about 1 m. into the sea, and bears about S.E. by S. from the small hill of Tripaloor, known by being much nearer the shore than any of the others. This reef should have a proper berth in passing, for it appears to be steep-to, as hereabouts the *Rockingham* ship struck upon a rock and soon bilged; had 6 fathoms under the bow, $6\frac{1}{2}$ a little way ahead, $5\frac{1}{2}$ under the stern, and 4 fathoms at the main chains. From the wreck two of the Seven Pagodas bearing S.W., and the extremes of the land from N. to S. by W., *estimated* distance off shore about 2 m. **Covelong**, about 17 m. to S. of Madras, is a village now, but was formerly a large town with a fort, called Saadut Bunder. It is 9 m. above the Seven Pagodas, and is a projection of the coast with a dangerous reef extending from it more than 1 m.

Covelong Reef, from 16 m. to 18 m. to the S. of Madras Light-house, seems to extend for some distance off shore to the N.E. of Tripaloor Hill. Vessels should not bring the Madras *flashing* light (seen best from a little way up the rigging) to the E. of a N. bearing, when abreast of Covelong.

St. Thome, St. Thomas, or Milapore, in lat. $13^{\circ} 1' N.$, bearing from Covelong N. $\frac{1}{2}$ E., about 5 leagues, is a small town close to the sea, having near it a plantation of Palmyra trees; the inland country is hilly, and the N.-most hill, called Mount St. Thomas, in lat. $13^{\circ} 0\frac{1}{2}' N.$, about

4½ m. from the sea, is easily known in sailing along; being lower than the others, regular and sloping in its shape, crowned with a church. There are other buildings and trees in its vicinity. From St. Thomas the coast stretches N. by E. nearly 4 m. to Madras, and is low towards the sea, but safe to approach to 9 or 10 fathoms: between them a black pagoda is seen in passing. The mouth of the Adyar River is about 4 m. to S. of the light-house.

From Point Calimere to Madras the greatest part of the coast is lined with a sandy beach, having a great surf rolling in upon it during both monsoons, which renders it hazardous and imprudent to land at any time in a ship's boat. Along the whole extent of coast, on this side of the peninsula, to Bengal River, the country boats are peculiarly constructed for passing through the surf; being built without timbers, with their planks sewed together, they bend to its force, and are very easily repaired.

MADRAS, or FORT ST. GEORGE, is the principal settlement on the coast of Coromandel, and the seat of the Governor and Council of that Presidency. The town within the walls of the fort, where most of the Government offices are, is composed of neat and well-built houses, with flat, terrace-roofs. The Black Town, which is larger, lies to the N., at a small distance, inhabited by Hindoo merchants, Moors, Armenians, Jews, &c., with some Europeans, who have not houses in the fort or in the extensive suburbs of Madras. A small river or canal extends around great part of the walls of the fortifications, adding considerably to the security of the place, which *was* formerly deemed a very strong fortress. It is a place of great trade, and the coast, although sandy close to the sea, becomes fertile and of an agreeable aspect at a small distance inland; the water is excellent, and plenty of all sorts of provisions may be procured for a fleet of ships, but fire-wood is scarce. There is railway communication now with Bombay as well as with Beypore. The Electric Telegraph communicates with all parts of Europe, and with most parts of Asia. We lack space for a full description of the trade and resources of Madras, which we hope to see soon increased by the creation of a harbour, where ships may load and discharge cargo at a wharf. But the name of Captain Christopher Biden, for so many years the worthy and zealous Master-Attendant, may be remembered as the framer of the Port Rules, from which we extract the following portions.

Port Regulations. All ships and vessels, other than those commonly known as dhonies, or native vessels, are directed to anchor with the Master-Attendant's flag-staff, bearing between N.W. and W. ¼ N., which will be found the most convenient anchorage for merchant vessels. The S. limits of the roadstead are usually resorted to by men-of-war, or with the light-house bearing from W. by N. to due W., in from 9 to 7 fathoms, which is the limited range of soundings throughout the roadstead. Any ship or vessel anchoring without those limits, or in more than 9 fathoms, will be liable to extra boat-hire.

Commanders of all vessels, coming to anchor in these roads, are advised to attach a buoy to their anchor; whereby giving foul berths may be avoided, and the position of a lost anchor will be indicated. All vessels should take up such a berth as will enable them to *wear* clear of all danger, in the event of casting in-shore when they weigh or part from their anchors; especially as the ground-swell, so prevalent here, tends, in spite of all precautions, to cast a vessel in-shore.

As ships have frequently parted, and accidents have happened, by riding with too short a scope, the Master-Attendant thinks it his duty to caution all Commanding Officers that no vessel is safe with less than 60 fathoms of cable in moderate weather, and 80 fathoms (or more) with a swell. Those unacquainted with Madras Roads may be told that, should any jerk be felt, either on the windlass or bitts, when riding with a chain (from the heavy swell which rolls in at times), cable should be veered until the jerk* is no longer felt, to prevent parting, and a second anchor should always be ready to let go. Efficient ground-tackling is essential to the safety of vessels in these roads.

Surf Signals. As the surf breaks very high on the beach, the country boats are employed on all occasions where communication with the shore is requisite. The boats belonging to the ships in the road frequently proceed to the *back* of the surf, where they anchor on the outside of it, and call the boats from the beach to carry on shore their passengers. When the weather is unsettled, with a heavy swell rolling in, the surf is often very high, rendering it dangerous for any of the country boats to pass to or from the shore; when this is the case, a *red and white chequered flag* is hoisted at the Master-Attendant's flag-staff, to caution all persons against landing from ships, which should be carefully attended to, for *many* lives have been lost through the temerity of Europeans proceeding to pass through the surf in defiance of the admonitory signal. When the surf is impassable, the First Distinguishing Pendant will be displayed *under* the other flag.

* We strongly recommend Saunders' Patent Springs for ships' cables.

The following signals are also made from the same place :—

Flag, white, with blue cross Weather suspicious, prepare for sea.
 — red, with swallow-tail Cut or slip.

After sunset, an approaching gale is indicated by three lights being hoisted; one at the flag-staff head, and one at each yard-arm; and a gun is fired every five minutes, for one hour, or for such time as may be deemed necessary, and masters are required to acknowledge seeing these signals, when made, by hoisting a good light at the peak, or other conspicuous place, most convenient.

Madras Roadstead is open to all winds excepting those that blow from the W., off the land, and there is generally a swell tumbling in from sea-ward, making ships labour or roll considerably at times. Many lost anchors are scattered about in the N. part of the road. To the S., where large ships moor in 9 to 11 fathoms, it is more clear. The bottom in many places is stiff mud, from which it is sometimes difficult to extricate the anchors. To moor in 9 fathoms, with the flag-staff from N.W. to W.N.W., is a good position for a large ship, where she will be about $1\frac{1}{4}$ m. from the shore; but ships having a cargo to discharge often moor in 8 or 9 fathoms abreast the Master-Attendant's flag-staff, with it bearing W., or W by N. In the bad-weather season it is prudent to anchor well out, and keep the ship ready to proceed to sea, should circumstances render this advisable. The gales generally commence at N.W., blowing strong from the land, with which ships can run off shore before the wind veers to the N.E. and E., when it would be impossible to get out to sea. From beginning of Oct. to mid-Dec. is considered the most dangerous season to remain in Madras Road, or at any other ports on this coast. Gales also happen in April and May,* notwithstanding which, ships are found in Madras Road at all times, for these gales are not frequent; and if a ship be kept in good condition for proceeding to sea, embracing the opportunity to weigh, cut, or slip, and run out on the first approach of a gale, there is probably little danger to be apprehended; but many ships, by remaining at anchor, have at various times been driven on shore. The severe storms at Madras generally commence from the N. or N.N.W., shift to the N.E. and E., where it blows a hurricane, and then veer to S.E., raging with equal violence. The holding-ground in Madras Roads is good, but there is generally a heavy swell from sea-ward, especially if the wind remains long at E. The only dangerous time for large vessels is during a cyclone, which happens about once in nine years. When strong E.N.E. winds blow for any length of time in the N.E. monsoon, a heavy sea rises which few native vessels can ride out, and getting under weigh is difficult, as the wind is nearly *dead on* to the shore. Many vessels and lives have been lost in these short E. gales, which seldom last more than twelve hours, and do not affect the barometer at all, although it gives timely notice of a cyclone.

In fine weather, the surf-breaks about 300 ft. from shore, and in squally weather about 450 ft. When it blows hard from the E., it breaks nearly 1,000 ft. from the beach; but on these occasions it is difficult to distinguish the break of the surf from that of the sea. In ordinary weather, the surf-wave is not above 8 ft. high; in rough weather, about 6 ft.; and during a gale 12 or 14 ft. When the land-wind blows *dead off* shore, the surf-wave is often very high, but then there is only one slow heavy roller, and boats can lie by for it, better than when the surf is lower, but quick, following, and confused. There is not so much danger in crossing the Madras surf as commonly supposed. Return cargo-boats now and then get swamped through negligence, but accidents in passenger-boats are almost unknown. Coming on shore in a heavy surf is more dangerous than going off, as it is more difficult to keep the boat *end on*. The Masoolah boat is the only kind of boat that is fitted for the surf, and is not injured by bumping on the sand when landing; they carry about $1\frac{1}{4}$ tons of dead weight.

Current. In the beginning, and during the strength of the N.E. monsoon, the current sets strong along the coast to the S.; it is at its maximum strength ($2\frac{1}{2}$ to 3 knots) in mid-Nov.; sometimes 2 knots an hour in Dec., but abates in Jan. During the S.W. monsoon, particularly in the early part, after 1st of Feb., the current frequently runs equally strong to the N., which makes it necessary for ships to fall in with the land to windward of the port to which they are bound. The winds are then between S.E. and S. by W., the *along-shore* winds. This caution ought not to be neglected by ships that sail indifferently upon a wind. The *Lushington*, in Feb., made the land at Pulicat, and anchored in 7 fathoms, with the flag-staff N.W. by W., the current running strong to the N.; with sea-breezes scant at S.E., and land-breezes at S.W., she was two days getting to Madras. The *Duncan*, *Madras*, and *Anna*, also fell in with the land a little to the N., 5th Feb.,

* For monsoons and gales in the Bay of Bengal, and at Madras, see pages 317 and 318.

and did not reach Madras till the 7th, at midnight. Ships approaching Madras after the 1st Feb., ought, therefore, not to make the land to the N., but endeavour to steer direct for it, or rather to make it bearing to the N.W., particularly if the wind be Southerly. In the opposite season, from Sept. to Feb., ships should endeavour to make the land a little to the N., or with the light-house bearing S.W.; for many ships which made the land a little to the S. of Madras in the N.E. monsoon, have been from one to two and three weeks gaining a few miles to the N., and with the utmost difficulty reached the port. The maximum velocity of the current appears to be 3 m. per hour.

Tides. It is H. W. on F. and C. of the moon at 7 h. 30 m., and the rise of tide at the highest springs is $3\frac{1}{2}$ ft. nearly. During a heavy gale from the E., the sea has risen 6 ft.; and, in a hurricane, as much as 10 ft., then washing over the roadway or *bulwark*.

Light. Since 1841 there has been a good light-house, in lat. $13^{\circ} 5' N.$, lon. $80^{\circ} 17' E.$, on the esplanade N. of Fort St. George, exhibiting at 132 ft. above the sea a light *flashing* every two minutes, to guide ships clear of the Pulicat Shoal and into the road, and seen in clear weather 6 to 8 leagues. From the S.E. extremity of the Pulicat Shoal the light bears S.S.W. 16 m.; but no ship, when hauling in from the N. for Madras Road, should bring the light to bear to the S. of S.S.W. $\frac{1}{2}$ W., unless her position be well ascertained. A serious risk may be incurred by incautiously approaching the dangerous vicinity of the Pulicat Shoal, as hazy weather or other causes may obscure the light; true soundings and a vigilant look-out are imperative.

The Observatory at Madras is in lon. $80^{\circ} 14' 20'' E.$, or $2' 40'' W.$ from the light-house.

The Time Ball, by which vessels can regulate their chronometers, is dropped on the Custom-house, near the base of the screw-pile pier, at 8 h. 20 m. 57.3 sec. a.m. of Madras Observatory time, corresponding to 3 h. a.m. of Greenwich mean time.

Vessels may ascertain the error of their chronometers, by noting the time of the flash from the 8 o'clock evening gun, which, being also noted at the Observatory, is given in Madras mean time from the Master Attendant's office the following morning. Too much reliance, however, should not be placed on this method, as the flash cannot at all times be distinctly seen at the Observatory.

The Screw-pile Pier, which starts in an E. direction from the sea-bulwark by the Custom-house, is 40 ft. broad and upwards of 1,000 ft. long, with a T-shaped head, which is 160 ft. long in a N. and S. line. Railway lines are laid down along the main pier, and the rest of the breadth is for foot passengers. There are six fixed and eight movable cranes on it, and goods and heavy machinery are landed at certain fixed rates. All goods landed, which are subject to duty, will be discharged into the Custom-house. All goods landed, which are free from duty, will be discharged at the inner end of the Pier, from whence parties must make arrangements for their further removal. Water is supplied to shipping at 2 annas per ton; this is brought to the Pier-head by pipes from the seven wells on the N. side of Black Town. The Madras Railway has one terminus on the beach on the N. side of Black Town, and 3 furlongs to the N. of the Screw-pile Pier.

Enore, a village in lat. $13^{\circ} 14' N.$, bears from Madras N. by E. $\frac{1}{2}$ E., distant 3 leagues; and about $1\frac{1}{2}$ m. to the S. of the village stands Enore House, close to the sea. Nearly a league to the N. of that house is situated the S. extremity of **Pulicat Shoals**, bearing about E.S.E. from a thick tope of trees, which is the first to the N. of Enore House, and may be known by two trees at its S. extremity, separated from the rest. The sea generally breaks about $1\frac{1}{2}$ m. from the shore, on the S. part of the shoal or reef opposite the tope of trees, there being less water on this part than anywhere else,—1 and 2 fathoms. The most projecting and dangerous part of the reef is a place with 3 and $3\frac{1}{2}$ fathoms, hard sand, distant 3 to 5 m. from the S. part mentioned, where it breaks, and the same distance off the shore abreast, having 10 and 11 fathoms very near it on the outside. Between this 3-fathoms bank and the S. part of the reef that breaks, there is an inner passage (which requires a pilot) leading to **Pulicat Road**, or **Anchorage**, which is in 7 or 8 fathoms, from 1 to 2 m. off shore, abreast of the light-house, which is by the old flag-staff. Large ships ought to pass outside, and if bound into Pulicat Road, should not come under 13 or 14 fathoms, until the flag-staff is brought to bear W. by N.; they may then steer for it, and will not have less than $5\frac{1}{2}$ or 6 fathoms, sandy bottom, in crossing the N. tail of the reef. Between Enore House and Pulicat, the shore presents a regular convex front to the sea, and from Madras is low, abounding with trees to the S. of Enore. Inland there is a high chain of mountains, called the High Land of Pulicat, or Pulicat Hills, at the S. part having a small piece of table-land, or hill, called **Kettle Bottom**, which bears W. from Pulicat Flag-staff, and W.N.W. when on with Enore House. In lat. $13^{\circ} 22' N.$, lon. $79^{\circ} 45' E.$, a little to the S. of Kettle Bottom, there is a hill less elevated, called **Haggery Nose**, remarkable by a small crooked knob on it, bent over to the S., and resembling a horn.

Pulicat Light. The Light-house, in lat. $13^{\circ} 25' N.$, lon. $80^{\circ} 20' E.$, exhibits a *fixed* red light on a white tower in the position of the old flag-staff, at 73 ft. above the sea, visible 6 or 7 m.

Mariners are reminded that when this light bears W. $\frac{1}{2}$ N., a vessel will be to the N. of the shoals, and the Madras Light should not be brought to the S. of S.S.W. $\frac{1}{2}$ W.

From Madras Road, to pass clear of the reef stretching along the coast from Enore to Pulicat, the course is N.N.E., and the distance about 6 leagues to its outer edge, about $3\frac{1}{2}$ m. off shore to the S.E. of Pulicat. At this part it is steep, from 10 and 11 fathoms to 4 and $4\frac{1}{2}$ fathoms, and should not be approached under 12 or 13 fathoms in a large ship; neither ought the S. extremity of the reef to be borrowed on under these depths. In steering along the coast from Madras, a ship ought not to shoal under 12 or 13 fathoms, particularly in the night; she ought to keep out in 16 or 17 fathoms when abreast of Pulicat Shoals, which are most projecting with the Red Light of Pulicat bearing about N.W. by W.; but in hazy, thick weather, this might not be seen. If the Madras Light is discernible, it must bear to the W. of S.S.W. $\frac{1}{2}$ W. in passing those shoals. The depths are from 45 to 50 fathoms on the outer edge of the bank of soundings, about 3 or $3\frac{1}{2}$ leagues off shore, on this part of the coast, which is steep, and from 18 to 20 fathoms about 4 and $4\frac{1}{2}$ m. off shore. As the depths decrease suddenly from 18 to 15 and 11 fathoms, then to $4\frac{1}{2}$ or 4 fathoms on the edge of Pulicat Reef, the *hand lead* is of little use.

Armogon, Armogham, or Doogoraspatam, in lat. $14^{\circ} 1' N.$, lon. $80^{\circ} 10' E.$, bears nearly N.N.W. from Pulicat, distant 12 leagues: about half-way between them Point Pondy projects considerably into the sea, with a shoal off it about 2 m. to the S.E.; from Point Pondy the shoreline recedes to the N.N.W.

ARMOGHAM SHOAL nearly joins to the shoal that fronts Point Pondy, its S.E. extremity bearing N.N.E. from that point, distant 2 m., and from thence it extends about N. by W., parallel to the coast $3\frac{1}{2}$ leagues, till opposite the entrance of Armogham River, its outer edge being 2 leagues distant from the shore. The depths on it are generally from $3\frac{1}{2}$ to $1\frac{1}{2}$ fathoms, but on its S. part, to the N. of Point Pondy, there are only 2 fathoms in some places, where it occasionally breaks; very near its outer edge you find from 7 or 8 to 9 and 10 fathoms, increasing quickly to 28 or 30 fathoms at 3 or 4 m. distance from it, in steering to the N.E. Between the inner edge of the Shoal and the coast there is a space, from 3 to 4 m. wide, now called **Blackwood Harbour**, with soundings from $4\frac{1}{2}$ fathoms near the shore, to 6 or 7 fathoms near the Shoal, where ships might anchor with safety in the fair-weather monsoon, near the entrance of Armogham River, by passing round the N. end of the Shoal, with the hill bearing W. $\frac{1}{2}$ S. There is also a narrow channel, leading into Blackwood Harbour, round the S. end of the Armogham Shoal, between it and the shoal that fronts Point Pondy. But the hill, and also the coast, is frequently so obscured by haze, that the land seems always more distant than it really is; and many ships having got on the shoal without seeing land, induced them to think that this shoal was situated far out from the coast, and it got the name of the *London Bank*. A ship bound from Pulicat to the N., and wishing to keep near the shore, may continue to steer along in 12 to 14 fathoms, and when abreast of Point Pondy she ought not to come under 14 fathoms, to give a berth to Armogham Shoal. Armogham Hill, in lat. $14^{\circ} 3' N.$, and $2\frac{1}{2}$ leagues W. from the entrance of the river, is of regular form, detached from any other high land. If bound into Armogham Road, a ship ought to keep in 11 or 12 fathoms until Armogham Light bears S.W. by S., or the hill bears W. $\frac{1}{2}$ S., or on with the N. grove at the entrance of the river, which will be seen from the poop, and the Kettle Bottom, *if visible*, will then bear S.W.; she may then steer direct for the hill, and will pass to the N. of the shoal in not less than 6 fathoms, until she anchor opposite the river in 5 or 6 fathoms, within 2 m. of the shore.

Light. A *fixed* light is now exhibited at the village of Moona, or Moonapolium, in lat. $13^{\circ} 53' N.$, lon. $80^{\circ} 12' E.$, 95 ft. above the level of the sea, to facilitate the navigation in the vicinity of the Armogham Shoals, and in clear weather is visible about 15 m. The light bears due W., and 6 m. from the shoalest part, which has 9 ft.

Kistnapatam, or Kalitore, bears from Armogham nearly N. by W. about 5 leagues; the coast between them is low, and may be approached to 6 fathoms; ships anchor abreast of Kistnapatam River in 5 or 6 fathoms. Between it and Armogham, there is a place called Pamanji, near the mouth of the Soornamooky River. From Kistnapatam a sand stretches along the coast to the N., around Point Pennaur, about 4 leagues' distance, called Shallinger Sand, which projects about 3 or 4 m. from the shore, having regular soundings of 4 and 5 fathoms on its outer edge.

Maipadu, lately become a place of much trade, is in lat. $14^{\circ} 31' N.$ Point Pennaur, in lat. $14^{\circ} 36' N.$, formed on a part of the coast, having a convexity to sea-ward, is not remarkable. The Pennaur River mouth is to the N. of the point; and further to N.N.W. are the salt golahs of Varny and Eskapilly, called also Iskapully and Divelan. Still further to N. are those of Jualdine, Ramiapatam, and Pakala.

Pakala (with which is associated the small village of Itamakla), in lat. $15^{\circ} 20' N.$, bears from Point Pennaur about N. by W., distant 15 leagues; the coast between them is generally low,

fronting the sea, and may be approached to 7 fathoms. Inland from this part of the coast there are hills, which may be seen at a considerable distance. The Goondlacamma River mouth, in lat. $15^{\circ} 27' N.$ (near which are the salt golahs of Kuttowputtum), is considered to bound the coast of Coromandel to the N., beyond which the coast of Golconda begins; but the appellation of Coromandel is often applied to the whole of the coast, as that of Malabar is to the whole extent of coast on the W. side of the peninsula.

Kottapatam, or Kuttowputtum, in lat. $15^{\circ} 26' N.$, is the N.-most port of Nellore district, and the shoalest parts of the Mootapilly Shoals bear E. by S. distant 9 m. off shore from this place.

MOOTAPILLY SHOAL (least water $2\frac{1}{2}$ fathoms), is in lat. $15^{\circ} 23\frac{1}{4}' N.$, and 5 m. distant from the shore, Ongole, or Pillore Hill bearing from it W., distant 17 m. The shoal-patch of $2\frac{1}{2}$ fathoms bears E. by S., and is 9 m. off shore from Kuttowputtum; and it lies S.W. from False Point Divy about 6 leagues. Mootapilly Bank extends to several miles' distance all around the above-mentioned shoal, having in some places hard bottom, with overfalls, from 5 and $5\frac{1}{2}$ fathoms to 8 and 9 fathoms, water. Ships passing here in the night ought not to shoal under 24 or 20 fathoms, nor under 14 or 15 fathoms in the day-time, on the outer edge of the bank, which shelves off from 18 or 20 fathoms to no ground 60 fathoms, at 6 m. distance. The shoal-patch has from $5\frac{1}{2}$ to 8 fathoms near it all around, hard irregular soundings, which do not point out its proximity; several Bengal ships have accidentally got on it in $2\frac{1}{2}$ or 3 fathoms, and were in imminent danger.

COAST OF GOLCONDA.

Mootapilly, or Motupalli, in lat. $15^{\circ} 44' N.$, lon. $80^{\circ} 17' E.$, and about 9 leagues to the N.N.E. of Pakala, is a small village $\frac{1}{2}$ m. inland, not discernible from a ship; but with the aid of a telescope, a small pagoda is perceptible. There are about twenty detached Palmyra trees to the N. of the landing-place, and about a mile to the S. a thick grove of trees with a *clump* on its S. part higher than the rest. With the N. extremity of a piece of high land in one with a thick grove of trees, you are abreast the proper anchorage, in lat. $15^{\circ} 42' N.$ Coming from the S. towards Mootapilly, a vessel may keep near the land in soundings between 6 and 8 fathoms, to pass inside of the $2\frac{1}{2}$ -fathom shoal, situated on the extensive bank to the S.E. and S. of Mootapilly.

From Mootapilly to False Point Divy, the coast runs N.E. by E., then E. about 6 leagues to Nizampatam; thence E. by S. and S.E. to the mouths of the Kistnah River, and forms a bay to the W. of the point; in this space the coast is low and woody, having the villages of Pettahpilly, Epoorpaliem, and Nizampatam, with two small rivers near them; Pettahpilly, in lat. $15^{\circ} 50' N.$, may be known by a flat grove of Palmyra trees near it. **Nizampatam**, in lat. $15^{\circ} 54' N.$, lon. $80^{\circ} 38' E.$, is a large town, about 2 m. inland, up a small river, with an extensive coasting trade.

Divy False Point, in lat. $15^{\circ} 45' N.$, lon. $80^{\circ} 54' E.$, projects from the main to S., forming the E. side of Pettahpilly Bay, having branches of the Kistna falling into the sea in its vicinity. A bank of very shoal water projects from this point 7 m., both to the W. and S., requiring caution in passing, as the depths near its edge decrease rather suddenly in approaching from sea-ward, there being 35 and 40 fathoms, 5 miles outside the edge of the bank that extends from False Point along the coast, and around Point Divy; but the depths, from 10 or 12 fathoms on the edge of the bank, decrease pretty regularly to 5 and $4\frac{1}{2}$ fathoms farther inside. Ships coming from Mootapilly ought to steer along the coast in from 8 to 9 fathoms until they approach False Point Divy; then haul out to the S.E., round the shoal flat that fronts it, which should not be borrowed on under 7 fathoms, even during fine weather. The coast from False Point to Point Divy being very low, is scarcely seen in fine weather from a vessel's deck, and not at all in hazy weather from the outer edge of the shoal flat, upon which the corvette *Favourite*, and other ships, have grounded. If the low land of False Point Divy be *in sight* from a vessel's deck, she is much nearer in than prudence allows. There is no correct survey of the mouths of the Kistnah, and its banks are shifting and advancing sea-ward.

Divy Point, in lat. $15^{\circ} 58' N.$, lon. $81^{\circ} 11' E.$, bears from the False Point N.E. by E., distant 7 leagues: the coast between them is low, with a shoal flat extending from it to the distance of 3 m. Ships in passing may occasionally borrow on the flat to $5\frac{1}{2}$ or 6 fathoms with a commanding breeze, as the water shoals gradually; but suddenly in coming from sea-ward on the edge of the shoal. The point is low, and, before the erection of the light-house, was without any distinguishing mark, except some trees covering it; for the low level coast which stretches from it to the N.N.W., forming the W. side of the semicircular bay of Masulipatam, is destitute of them. Around the point, and between it and the former place, several branches of the river Kistnah fall into the sea; the great quantity of earth carried during the rains by these rivers has probably formed the shoal flats along this part of the coast. The rise and fall of tide is seldom more than

4 or 5 ft. in the spring-tides at the mouths of the rivers; but it sometimes happens, when a severe gale of wind blows from the sea, that the low land is inundated, causing great destruction of property and lives. In approaching Point Divy from the E., the depths decrease quickly after a ship gets on the edge of soundings, about 5 leagues off shore; therefore the lead ought never to be neglected, when standing towards it, or any of this low coast.

Light. A *fixed* light on a white column was exhibited 2 m. N.W. of the point in 1851; it is 90 ft. above the level of the sea, and in clear weather may be seen 4 leagues. Divy Light is in lat. $15^{\circ} 59' N.$, lon. $81^{\circ} 9\frac{1}{2}' E.$ It is said to be visible only between the bearings of N., round by the W., till it bears S.W. Therefore a vessel (especially a fast steamer) must be cautious, when approaching from the S.; and if she gets a cast of the lead, without seeing the light, should at once haul off shore.

MASULIPATAM, in lat. $16^{\circ} 9' N.$, lon. $81^{\circ} 10' E.$, bears nearly N. $\frac{1}{2}$ W. from Point Divy, distant about 12 m.; the coast between them is low and sandy, lined with a shoal flat, having $3\frac{1}{2}$ and 4 fathoms on the edge of it, about 5 m. off shore. With a S. or W. wind, a ship bound into the road may, after bringing Point Divy Light-house to bear about W. in 7 or 8 fathoms, steer along the edge of the flat, shoaling to 5 or $4\frac{1}{2}$ fathoms gradually, as she approaches Masulipatam, which will easily be known after rounding the point, by the appearance of the flag-staff and building; if she get into 4 fathoms, or have a hard cast, she ought to haul out instantly to the E. The shore is flat all round the bay, the depth in approaching it does not decrease more than $\frac{1}{2}$ fathom for the distance of nearly a mile. Ships, in the fair season, generally anchor at Masulipatam abreast the town, in from 4 to 5 fathoms, mud, with the flag-staff from W. to W. by N., off shore 4 or 5 m. This town is situated on a small branch of the river Kistnah, and is a place of considerable trade; the export chiefly cottons, printed in a variety of patterns.

Light. At the flag-staff, a *fixed* Red light is exhibited, at an elevation of 90 ft. above sea-level; it is merely a port-light, and visible only 6 m.

Directions. Ships bound to Masulipatam, from Feb. to Oct., should make Point Divy, taking care not to fall to the N.: in coming from Madras, they should keep in soundings; but to avoid the Armogham Shoal, and the Mootapilly Shoal, they ought not to borrow under 20 fathoms in passing, particularly in the night. When False Point Divy is approached, or the coast between it and the *true* point, they may, with the wind at S.W. or W., haul into 8 or 9 fathoms, decreasing the depth of water gradually when round the point, until they reach the road of Masulipatam. This proceeding is proper during the strength of the S.W. monsoon; but in Feb., March, and April, if the winds incline from S.E. or E., *which sometimes happens*, it will be prudent to keep at a reasonable distance from the land, and steer directly from sea-ward into the bay at Masulipatam. In Oct., Nov., and part of Dec., the weather is very unsettled, the winds generally from N.E. and E., and current running mostly strong to the S.; therefore, ships bound into any of the ports on this coast during these months, should fall in with the land to the N. of the place to which they are bound, for they will seldom be able to gain any Northing when near the land in this season. As most of the roads on the coast are exposed to gales of wind from the sea, which are liable to happen from 1st Oct. to 1st of Jan., few ships remain in them during this period, except on particular occasions. From 10th or 15th of Oct. to 10th or 15th of Dec., is considered the most precarious time. Gales of wind have at times been known to happen during the S.W. monsoon, particularly at its commencement in April or May; a storm has also been experienced in Aug., although bad weather is seldom apprehended when the S.W. monsoon prevails. In May, the coast of Coromandel was visited by a violent tempest, the wind chiefly blowing from N. to N.E., with a deluge of rain, which destroyed much property along the coast, and about Coringah. The sea inundated the low country; several vessels were carried into the fields by the inundation, and afterwards grounded on more elevated parts of the land. One new ship, building on the stocks at Coringah, was swept away into the river and destroyed. In Cuttack, and the low country around Point Palmiras, a devastation of property and loss of life took place by the inundation, followed by famine, whereby multitudes of the natives perished who escaped from the inundation.

Narsapour, or Narsipour Point, in lat. $16^{\circ} 18' N.$, lon. $81^{\circ} 42' E.$, bears from Point Divy nearly N.E. by E. 12 leagues; and from Masulipatam about E. by N. 11 leagues; it forms the E. extremity of the great bay of Masulipatam; and close to it, on the W. side, the river of Narsapour, the W. branch of the Godavery, falls into the sea; the other branches of that river debouche near Point Gordeware, and at Coringah. On the bar of Narsapour River there are 8 or 9 ft. water, and 3 to 5 fathoms inside, in the passage to the town; a shoal bank projects about 3 or 4 m. to the S. and W. of the river and point, on which the sands are liable to shift and alter the channel. Narsapour town is about 6 m. from the river's mouth; and adjoining it is the ancient town of Madapollem, once famous for its cloths, but now half cut away by the encroachment of the river Kistnah

Narsapour was formerly visited by English ships of considerable size, but now is frequented chiefly by native craft. Lightly-laden vessels enter the river by a channel known to the pilots. Cargoes are mostly discharged at Antavedy, near the river mouth. The anchorage in the road is in $4\frac{1}{2}$ to $5\frac{1}{2}$ fathoms to the W. of the point, near the edge of the flat that extends from the river off shore 4 or 5 m. In a direct course from Point Divy, across the entrance of the bay to Narsapour, the depths are from 14 to 24 fathoms, shoaling fast toward either point.

From Narsapour Point, the coast stretches nearly N.E. by E. about 10 leagues, then changes to N.N.E. and to N. for 5 to 6 leagues farther to Point Gordeware; the coast between them is low, and may be approached occasionally to 7 or 8 fathoms; but in a large ship it is prudent to keep farther out, particularly within 3 leagues of Point Gordeware, when she ought not to borrow under 14 or 15 fathoms in the night, which is *only* 4 m. off shore, towards the extensive shoal that surrounds the Point; between these points some streams fall into the sea.

CORINGAH BAY. Gordeware, or Godavery Point, in lat. $16^{\circ} 49' N.$, lon. $82^{\circ} 20' E.$, the S. point of this bay, is a low, narrow sand-bank, extending nearly N. and S. several miles, the N. of it being considered as the Point, though some navigators set the low islands on the W. side of the sand-bank for Point Gordeware, as these are covered with trees and bushes, but partly inundated at H. W. The sands surrounding the Point, on which the sea breaks, extend from it about 3 m. to the N.E. and 5 or 6 m. to N., having channels for boats between some of them. Hope Island is a dry sand-bank to the W. by N. of the Point, its N. part being in lat. $16^{\circ} 52' N.$, but the light-house (on its S.W. end) marks it; to the N. of Hope Island the bank consists of soft mud, where it fronts the sea, and the edge of this mud-bank, having 2 and 3 fathoms on it, extends from the N. extremity of the reef, about W.N.W. and W. by N. towards Coconada. A little to the W. of the edge of this bank the bottom becomes hard sand and soft mud alternately; for the whole space between Coringah River and Point Gordeware Reefs consists of channels from the river between banks that are dry, or barely covered at L. W. Much caution is necessary in approaching these reefs and shoals, as they are said to extend much farther than generally supposed, and to be much affected by storms and inundations, which sometimes occur on this coast, and by which great changes are produced. The *James Sibbald*, a fine Bombay-built ship, was wrecked on these reefs on the voyage from Bengal to England. The principal branch of Godavery River is to the N.W. of Point Gordeware.

Hope Island is covered with jungle, but intersected by several channels; and is, therefore, a group of islets, and on the S.W. end stands the Coringah Light-house. It bears from Point Gordeware about W. $\frac{1}{2}$ N. In thick weather this light may not be visible beyond 10 or 12 m., and as the outer edge of the reef is at least 4 m. from the light-house, a ship or vessel may, during such weather, be within 4 m. of the reef before the light or light-house has been discovered; therefore, soundings always require the most prompt and careful attention. Point Gordeware has extended to the N. since the first publication of Horsburgh's Directions, and the reef has also extended its limits both to the N. and E. These changes have shifted the anchorage off Coconada, or in Coringah Bay, farther to the N., and are not in any way detrimental to the safety of that anchorage. The Master Attendant sees to the shifting of the buoys and to the berthing of ships. On account of the rapid increase of the shoals to the N. of Hope Island Light-house, it is most probable that a light-vessel will be placed there. Buoys were placed in August, 1862, the outer or bell buoy in 6 fathoms, N.E. $\frac{1}{2}$ N., about 5 m. from Hope Island light. Middle buoy in 5 fathoms, N. by E., 6 m. from the light; and the inner buoy in 3 fathoms N. $\frac{1}{2}$ W., 7 m. from the light. Vessels are no account to go inside, or to the S. or W. of these buoys. As the buoys are much exposed to heavy seas, caution is requisite not altogether to depend on their being in their proper position.

The Bay of Coringah is well sheltered, and is only open from N.E. to S.E. The anchorage is on good holding-ground, deepening to the N.E.; and a ship or vessel driving on the mud-bank would not sustain any material injury. The mouth of Coringah River is about S.S.W. 7 or 8 m. from the anchorage, and the bar, on which is a ledge of hard sand, with soft mud on either side of it, is distant from the river's mouth about 6 or 7 m.; 9 ft. is about the average height of water near the bar at F. and C. of moon, when it is H. W. at 9 o'clock, and the rise and fall of tide is from 5 to 6 ft. during the springs.

Hope Island Light-house. The navigation of Coringah Bay was improved by the erection of a light-house on S. point of Hope Island, in lat. $16^{\circ} 49' N.$, lon. $82^{\circ} 18' E.$; it has a *fixed* light, 73 ft. above H. W., and may in clear weather be seen about $4\frac{1}{2}$ leagues; but, as the sand-banks are rapidly gaining upon the sea, and now extend fully 5 m. to the N. of the Light-house, a *bell-buoy* was placed at a distance of 5 m. to N.E. of the Hope Island light, and *two other buoys* between that and Coconada, to guide ships to the proper anchorage. Ships should anchor with the light-house on Hope Island bearing S. by E., and Coconada Light-house S.W., where they will have 4 or 5 fathoms at L. W., soft ground, 2 m. off shore. The bar off Coringah River will bear about

S.S.W. Here they may be supplied with wood, water, and provisions; and in the fair season, any repairs wanting may be effected.

Coringah Town, in lat. $16^{\circ} 49' N.$, is situated on the branch of Godavery River, generally called Coringah River, and bearing W. from Gordeware Point, distant 6 m. This is the best place on the coast for repairing or building small vessels, there being a considerable number of shipwrights and caulkers constantly employed building or repairing the numerous coasting traders which belong to or frequent the river or road. On the bar off the entrance of Coringah River there are from 3 to 5 ft. over a sandy bottom in common spring tides; it is H. W. at 9h. on F. and C. of moon, rise of tide from 4 to 6 ft. on the springs, and $2\frac{1}{2}$ or 3 ft. on neap tides; but when storms happen, or strong gales blow from sea, the country, being low, is liable to inundations, the sea having been known to rise greatly above its ordinary level at such times. The water here, as well as in the road, is smooth, and outside the bar, the bottom being soft mud, it is common to see the country vessels aground in it. Coringah Town is situated on the S. shore, about 1 m. from the point that forms the entrance on the same side; the depths in the river, within the bar, are in general $2\frac{1}{2}$ fathoms. Ingeram town is about 6 leagues up the river, from which a considerable quantity of piece-goods is exported. Contiguous to it, and on the main branch of the Godavery, stands the French settlement of Yanam.

Coconada, at which stands the pagodas of Jaggernautporam, in lat. $16^{\circ} 56' N.$, lon. $82^{\circ} 14' E.$, and about 7 m. nearly N. from Coringah, is a village with some white buildings, and two small pagodas near it. The bar of the river, which is about 1 m. to the E. of the village, has been improved by dredging and the throwing out of the two stone groynes; formerly it was scarcely navigable by boats at L. W.; inside the depths are from 8 to 12 ft.; but this river being small, it is seldom frequented, except by cargo-boats or dhonies. The anchorage in the road used to be abreast the river entrance, in 5 or $5\frac{1}{2}$ fathoms, soft mud, with the village bearing W. by N., and Coringah flag-staff about S.S.W., off shore 1 or $1\frac{1}{2}$ m. Ships have now to anchor about 4 m. to the N.E., and they can obtain refreshments and water at this place.

Light. Coconada Light-House, in lat. $16^{\circ} 56' N.$, lon. $82^{\circ} 15' E.$, now shows a small *fixed* light, on a good stone column, as a guide to the anchorage.

Soundings. To the S.E. and S. of Point Gordeware, the bank of soundings is steep, from 45 or 50 fathoms about 4 leagues off, to 16 or 18 fathoms in a run of 3 or 4 m. towards the shore; care is therefore requisite in the night, when approaching the point from sea-ward, as depths decrease suddenly; a large ship ought not to come under 16 or 17 fathoms, and should be prepared to tack immediately after getting soundings. To the N. of the point the soundings are more regular, and do not decrease so suddenly as to the S.E. and S. Although the reefs surrounding Point Gordeware are dangerous to approach in the night or in thick weather, they may occasionally, with a gentle commanding breeze, be borrowed on in the day to 10 fathoms; but as the dry banks to the N. of the light-house are ever varying, by freshes out of the rivers, great caution is requisite in rounding these shoals. With a S. wind, bound to the anchorage in Coringah Bay, a ship,* after rounding the reef off Point Gordeware, may steer to the N. along the edge of the mud-bank in 6 or 7 fathoms until she reach the road; or in working, with the wind from W., she may borrow on the edge of it to these depths at tacking; but the soundings are not always regular.

DIRECTIONS. Bound to Coringah from the N., during the S.W. monsoon, vessels should haul in towards the coast to the S. of the Dolphin's Nose, and beat to windward close along shore. From the Dolphin's Nose, by Vizagapatam, until near Pentacotta, the coast is high, bold, and rocky, and free from all danger, but should not be approached under 12 or 14 fathoms, as those soundings are not above $1\frac{1}{2}$ or 2 m. off shore. There is a high rock (Pigeon Island) close to the beach, near the village of Pudimadaka, situated 5 or 6 leagues S.W. of the Dolphin's Nose: Wattara, marked by a bungalow on the summit of a hill, bears about S.W. $\frac{1}{4}$ W., 10 leagues from that promontory. Pentacotta, known by a detached conical or sugar-loaf hill, bears S.W. about 7 or 8 leagues from Wattara, and a few miles to the S. of that position the bold and rocky coast gradually terminates, and may be approached to within 8 or 9 fathoms; and when off the village of Oopauda, 20 leagues S.W. of the Dolphin's Nose, and 4 leagues N.E. of Coconada, vessels may stand in shore to $4\frac{1}{2}$ and 5 fathoms, where a soft muddy bottom commences. When thus far to windward, care should be taken, by making short tacks, to hug the coast, as the freshes from the several mouths of the Godavery in June, July and August, set with such rapidity, that ships and vessels may, without precaution, experience much difficulty and delay in beating up for the anchorage. Having sighted Hope Island Light-house, by day, or the light by night, it may be brought to bear from S. $\frac{1}{4}$ E. to

* A light-vessel will probably soon be moored to the N.E. of Hope Island Light-house, as the shoal-banks are rapidly advancing sea-ward in that direction, rendering the present light of little use.

S. by E., and with the Coconada Light-house bearing about S.W. to S.W. by S., ships and vessels may anchor off Coconada in 5 fathoms, soft mud, and off shore $1\frac{1}{2}$ or 2 m., as the lead and light will be the only guides, and night soundings must then be carefully attended to.

Vessels from the N., bound to Coringah during the N.E. monsoon, should guard against a S. current, and make the coast between the Dolphin's Nose and Wattara, when they may direct their course for the bay; but in this monsoon large ships should anchor in 6 fathoms, with the Coconada Light-house bearing S.W., where they will find good holding-ground.

Vessels from the S., bound to Coringah in the S.W. monsoon, should in the daytime make the land about Narsapour Point, and not come under 8 or 9 fathoms. This point is low and woody, and the coast presents the same appearance until past the large fishing-village of Bendamalunka, which is 13 m. N.E. by E. from the point. Thence to the reef off Point Gordeware the coast is intersected with low shrubs and sand-hills; about half-way between the village and the reef off Point Gordeware, there is a remarkable tope of Palmyra trees. When this tope bears about S.W., the light-house on Hope Island may be seen if the weather is clear. As several ships have been lost in the vicinity of this part of the coast, and as erroneous impressions prevail respecting the soundings and extent of the bank, Captain Biden, the Master-Attendant, in the steamer *Hugh Lindsay*, hauled within 3 m. of the coast in 7 fathoms, abreast the site where the ship *Active* was wrecked, and from that position the steamer edged away S.E. for 4 or 5 m., and carried regular soundings from 7 to 19 fathoms. The same experiment was made between that position and Narsapour Point, and with a corresponding result. Having passed the tope and sighted the Hope Island Light-house, ships and vessels should keep off in 12 or 14 fathoms until the light-house bears about W. by N., when they may edge away or haul up to the N., and (attending well to the lead) bring the light to bear S.W., in not less than 9 fathoms; on which bearing of the light there is now a **Bell-buoy** placed in 5 or 6 fathoms, water, to mark the outer limit of shoal water; and about $2\frac{1}{2}$ m. to N.N.W. of this, there is another, the **Middle buoy**. The **Inner buoy** is about 2 m. to N.W. of that, or about 3 m. to E.N.E. of Coconada Light-house.

With a working breeze these Coringah Banks may be approached to 8 or 9 fathoms; they are steep-to, and 6 or 7 fathoms are within the ridge of breakers, which are more or less visible according to the force and direction of the wind. Still holding on a N. course, and having brought the light-house to bear S.W., vessels may haul up for the bay to N.N.W., and gradually to N.W., after the Coconada Light is brought to the S. of a W. bearing; when it bears S.W., with soundings of 7 fathoms, soft mud, they should tack, and then prepare to anchor as previously directed.

During the night, when neither Narsapour Point nor any other shore can be seen, the coast should not be approached under 12 or 14 fathoms, and the greatest caution is at all times necessary when hauling in to make the Coringah Light. True soundings, a good look-out, and full preparation to tack or wear, or haul off shore at a moment's warning, must be attended to. Thick or hazy weather may obscure the light, and it may be prudent to stand off to the S. until daylight.

Ships and vessels from the S., bound to Coringah Bay in the N.E. monsoon, must endeavour to work up well to the N. of their port; but if they are driven to leeward, they must avoid the danger of being embayed, and should not bring Narsapour Point to bear to the E. of N., but stand to sea until they have gained sufficiently to windward of Point Gordeware, when they must attend to the sailing directions, and anchor in a windward direction, as already noticed.

The Coast above Coconada goes N.E. by N. and N.E. to Oopauda, in lat. $17^{\circ} 5' N.$; then N.E. to Pentacottah; thence N.E. by E. to Wattara. From Coringah to Pentacottah it is all low, but to the N. of that place the coast becomes high, bold and rocky. Samulcottah is a military station, about 3 leagues inland to the N.W. of Coconada, and at the back of that a range of hills commences, running about parallel to the coast-line, but 12 m. from it, and approaching nearer to the sea towards Vizagapatam.

Pentacottah River, in lat. $17^{\circ} 18' N.$, lon. $82^{\circ} 38' E.$, is at the S. extreme of the Vizagapatam district; its entrance may be known by two sand-hills and a cocoa-nut grove near the beach. Toonee conical hill is about 7 m. inland of Pentacottah. **Wattara**, a small town in lat. $17^{\circ} 26' N.$, lon. $82^{\circ} 52' E.$ (variously called, Ratadah, Vatarada, and Wattraw), bears from Point Gordeware N.E. by N., and from Coconada nearly N.E., distant $15\frac{1}{2}$ leagues: the coast between them may be approached with safety to 12 or 14 fathoms about 2 or 3 m. off shore, being bold and clear of dangers; the edge of soundings is seldom distant above 4 leagues from the shore. The low coast of Golconda terminates about 6 leagues to the N. of Jaggernautporam, where a ridge of hills or high land begins, stretching from thence along near the sea to Ganjam. Three leagues about E.N.E. from Wattara is the **Pillar Rock**, about $\frac{1}{2}$ m. off shore, in lat. $17^{\circ} 30' N.$, lon. $83^{\circ} 0' E.$ **Pigeon Island**, in lat. $17^{\circ} 38' N.$, lon. $83^{\circ} 18' E.$, is about 15 m. from Pillar Rock, and the village of Pudi, or Pudi-madaka, lies between them.

COAST OF ORISSA.

The Coast of Orissa, or Oriza, is said to commence to the S. of Wattara, extending from thence to the entrance of the River Hoogly; but the S. part of this coast was generally called the Northern Circars, and the name Orissa used for that part farther to the N.

VIZAGAPATAM, in lat. $17^{\circ} 42' N.$, lon. $83^{\circ} 17' E.$, is distant 10 leagues N.E. by E. from Wattara: the coast between them is a little convex, with middling high land near the sea, bold and safe to approach to 14 or 15 fathoms, within 2 or 3 m. of the shore. Vizagapatam may be known by the bluff headland, called the Dolphin's Nose, which forms the S.W. point of the road, but it is obscured *under* the high land, when viewed from the offing. About 5 m. to the S.W. is Pigeon Island, almost close to the shore, appearing like a small hummock, and not discernible until near it; the coast opposite this island is sandy and barren. When Pigeon Island bears about N., and 5 or 6 m. off, the Dolphin's Nose may be plainly seen, and other hills around Vizagapatam; one of these to the N. of the Road is called the Sugar-Loaf, but the highest is several leagues inland from the town. Waltair, known by its bungalows, on a cliff or rising ground, where most of the Europeans reside, is 3 m. to N. of Vizagapatam, and has been often mistaken for that place by strangers; vessels have sometimes anchored abreast it till informed of the mistake.

Anchorage. In the S.W. monsoon, the best berth for small vessels is close under the N.E. side of the Dolphin's Nose, in 6 fathoms, sandy bottom; it being steep-to. Large vessels, in the same season, may anchor in 8 or 9 fathoms, mud and sand, with the Green Hill (to the S. of Dolphin's Nose) bearing S.W., the Bar Battery, N.W. by W., and the Sugar-Loaf in one with Waltair House.

In the N.E. monsoon, it is prudent to anchor farther to the N.E., in the same depths, with Waltair House on with the W. side of the Sugar-Loaf, and the top of Green Hill just open with the Dolphin's Nose: the fort flag-staff will then be nearly in one with the centre of Middle Battery, and the mouth of the river open, where a ship will be in 8 fathoms, sand and mud, off shore $1\frac{1}{2}$ or $1\frac{3}{4}$ m.: this is a good berth, and ships ought not to anchor farther to the N. By anchoring farther out, in 11 or 12 fathoms, they are in danger of losing their anchors, the bottom being very stiff mud. On the bar at the entrance of the river there is from 8 to 10 ft. water, and sometimes more in the N.E. monsoon; but the sands are liable to shift, with a decrease of depth in the opposite monsoon. As the water shoals fast in standing into the road, sail should be reduced in time, before a ship is too near the shore. Abreast the Dolphin's Nose, at 2 or $2\frac{1}{4}$ m. distance, the depths are 20 and 21 fathoms, with it bearing about N.W.; and the shore continues equally steep from thence towards Pigeon Island: the bank of soundings hereabout extends $3\frac{1}{4}$ or 4 leagues from the land.

BIMLIPATAM, in lat. $17^{\circ} 53' N.$, lon. $83^{\circ} 27' E.$, bears N.E. about 5 leagues from Vizagapatam: the coast between them is bold, having 15 and 16 fathoms, water, within 2 or 3 m. of the shore. A hill projects in a headland on the S. side of the river, and all the land near this place is high. Ships may anchor in from 6 to 8 or 9 fathoms, abreast the river and village, in the S.W. monsoon; and a little farther to the N. in the other monsoon. From Bimlipatam the coast trends N.E. 8 or 9 m. (with some red cliffs half-way) to Konadah or Conara River, and about $1\frac{1}{4}$ m. to S. of the river is Konadah Point. Santapilly, or Chintapilly Village, is 3 or 4 m. to E.N.E. of Konadah. Nearly opposite this point lies a dangerous ledge of rocks under water, not easily discerned, distant 6 m. from the shore, called **Conara, or Santipilly Rocks**: close to them on the outside the depths are 16 and 17 fathoms; and a ship ought not to come under 17 or 18 fathoms in passing on that side.*

Light. A light-house on the roof of a house, showing a *fixed* light, 150 ft. above the sea, is placed on Konadah, or Conada Hill, $\frac{1}{4}$ m. inland, in lat. $18^{\circ} 34' N.$, lon. $83^{\circ} 36\frac{1}{2}' E.$, and in clear weather may be seen $4\frac{1}{2}$ leagues; it bears from the rocks N.W. by W. $\frac{1}{4}$ W.

SANTIPILLY ROCKS, about 16 m. to N.E. by E. of Bimlipatam, are in lat. $18^{\circ} N.$, lon. $83^{\circ} 43' E.$, and distant from the coast 6 m. They are about 10 ft. under water, steep on all sides, and their extent is not beyond 200 yards. When there is little wind and a smooth sea, the shoal presents no indication of broken or discoloured water, as Lieutenant Fell, when in search of it during very fine weather, anchored the surveying brig *Kristna* within 100 yards of it without observing the slightest appearance of the shoal. He then proceeded in the vessel's boats over the rocks, and found 10 ft. on the shoalest part; on the E. side 7 and 10 fathoms, and at its W. limit $10\frac{1}{2}$ fathoms, rocky bottom. Captain Biden, the late Master-Attendant, surveyed the rocks in the

* The Santipilly Rocks, being 6 m. off shore, the careful navigator must see the importance of keeping the lead going, rather than trusting to sight the light, which in hazy weather might be obscured.

steam-vessel *Hugh Lindsay*, during fine weather; and with a moderate breeze from S.W., and a ground-swell, the breakers were clearly discerned from the mast-head at 6 or 7 m., bearing due S., and Santipilly Peak bearing W. by N., in 7 fathoms, water, off shore about 2 m.; the breakers were soon after seen from the deck. The shoal is said to lie N.N.W. and S.S.E., in circumference about $\frac{1}{2}$ m., with 10 fathoms all round very close to the rocks.

The inner channel is safe for ships and vessels of every class, having 5 fathoms within 1 m. of the coast, and 9 fathoms within $\frac{1}{2}$ m. of the rocks; thus affording a clear channel of nearly 4 m. in breadth. When the Peak of Santipilly is visible, it affords an infallible guide to the position of these rocks, for it is a very remarkable land-mark; and, being at least 2,000 ft. above the sea, presents a striking contrast to all the hills in its vicinity. It bears N.W. $\frac{1}{2}$ W. from the rocks, and the base of the mountain is not more than 7 or 8 m. from the coast. The *Great* and *Little* hills of Conada, close to the beach, may be seen by day, when Santipilly Peak may be obscured. The light-house is on the N.-most or Little hill, which is about $\frac{1}{2}$ m. from the beach. But in thick weather, when no well-defined land-mark is discernible, then it becomes absolutely necessary to approach the coast between Ganjam and Vizagapatam with great care and caution, as change of current may, without strict attention to soundings, place a vessel in imminent peril close to, or upon the Santipilly Rocks, which should not be approached from the E. by night or by day under 17 fathoms.

The **COAST of GANJAM DISTRICT** commences at the Chicacole River, and goes up to the Chilka Lake. Chicacole is its chief town, having superseded Ganjam town in 1815.

Chicacole River, or the Nangulu, bears from Conada Light N.E. by E., distant 6 leagues: the coast between them is high, and may be approached to 10 or 11 fathoms, about 2 or 3 m. off shore. The town of Chicacole, formerly noted for its muslins, is 4 m. from the sea on the N. bank of the river. Its port, formerly known as **Mafooz Bunder**, is now only a petty village, as the river entrance is so choked up.

Calingapatam River, $4\frac{1}{2}$ leagues to the E.N.E. of Chicacole, is on the N. side of Sandy Point, in lat. $18^{\circ} 19' N.$, lon. $84^{\circ} 7\frac{1}{2}' E.$ It may be known by Garah Hill, about 4 m. inland, having a white pagoda on its side; but as it is sometimes obscured in hazy weather, a beacon has been erected on the point, which is long, low, and sandy, and has a reef of rocks extending from it about $\frac{1}{2}$ m. to sea-ward. In passing this point vessels ought not to approach nearer than 8 fathoms. The beacon is an obelisk of cut stone, with a cap standing on a pediment, 64 ft. in height. The town is on the S. bank of the river, between it and the beacon. The exports are chiefly rice, wheat, ginjely-seed, gram (Indian pea), hides, timber, and bees' wax. The best anchorage is in $6\frac{1}{2}$ to $7\frac{1}{2}$ fathoms, with Sandy Point S.W. by S., 2 to 3 m. off; and the highest upper-roomed house near the shore W.N.W. to N.W. by W., about $1\frac{1}{2}$ to 2 m. off shore.

Nowpada, or Bapanapandoo, in lat. $18^{\circ} 34' N.$, lon. $84^{\circ} 19' E.$, lies 20 m. to the N.E. of Calingapatam; a black and white column, about 50 ft. high, on the beach, distinguishes this place from others to the N. **Poondy, or Pudi**, in lat. $18^{\circ} 40' N.$, at the mouth of a small river, has a white obelisk near the travellers' bungalow, and a flag-staff, all three conspicuous objects. The river Pondy, or Poondy, has several rocks projecting from it to sea-ward. Over this place, at some distance in the country, the High Land of Pondy is high and uneven; along the coast it becomes of middling height, but equally uneven. Barwah, or Barva River, is to the N.E. of Pondy, having several hills contiguous, which are not very remarkable.

Barwah, in lat. $18^{\circ} 52' N.$, lon. $84^{\circ} 36' E.$, about 17 m. to N.E. of Poondy, may be distinguished by two black and white columns, about 50 ft. high, and the anchorage is abreast of them. To the S.W. of Barwah there are cocoa-nut trees, but only sandy shore to the N.E. **Sonapur, or Soonapoorpettah**, in lat. $19^{\circ} 8' N.$, and about 20 m. from Barwah, has a white obelisk and a white column, each about 50 ft. high; and also a flag-staff and custom-house; abreast of which vessels may anchor.

MONSOORCOTTAH, or GOPAULPORE, in lat. $19^{\circ} 15' N.$, lon. $84^{\circ} 54' E.$, is 4 leagues to N.E. of Sonapur. Carapar, an oblong hill, is near it, and 3 leagues from Ganjam. A little to the S.W. of Carapar Hill, upon a woody and level piece of land, stands Monsoorcottah Pagoda, and the river of Carapar, or Monsoorcottah, is about 4 leagues to the S.W. of Ganjam, having a small fort at its entrance. When a scarcity prevails on the coast, ships carry rice from Bengal to this place. Some moorings are now laid down for large vessels; an aggregate of 60,000 tons of shipping now annually visit this place. There is a large, white building on the beach, a godown for the Aska sugar, which is exported from this place. The custom-house is to the S. of the godown.

Light. At Gopaulpore there is now a *fixed* light, elevated 90 ft., and visible 6 m.; it is not far from the custom-house. The anchorage is with the light bearing N.W. by W. to W.N.W., and Saddle Hill about W.S.W., off shore about $1\frac{1}{2}$ m., in $9\frac{1}{2}$ fathoms. In this depth the bottom is stiff mud, with little sand; but nearer the shore it is sandy, and not such good holding-ground.

GANJAM (the flag-staff), in lat. $19^{\circ} 22' N.$ lon. $85^{\circ} 3' E.$, bears from Calingapatam River nearly N.E. by N., distant 27 leagues: the coast between them is high, and may be approached in general to 12 or 14 fathoms, about a league from shore. This place, which is 12 m. to N.E. of Monsoorcottah, was formerly the capital of the Ganjam district; but, since 1815, it has been superseded by Chicacole. The town stands on an elevated portion of the plain, with a range of mountains in the back-ground, but the country to the N. is low, and often flooded. At Ganjam a considerable trade is carried on, particularly by coasting vessels, many of which can enter the river, it being of considerable size. Ships may anchor in the road, abreast the fort or river entrance, in 8 or 9 fathoms, about 2 m. off shore. The bottom along this part of the coast is sometimes coarse sand and gravel, affording indifferent anchorage; and under 20 fathoms, about 3 or 4 m. from shore, the depths decrease suddenly in standing towards it. From Vizagapatam the bank of soundings lining the coast has generally from 40 to 45 fathoms on the edge of it, about 4 or 5 leagues off shore, then a sudden declivity to no ground: from 20 to 30 fathoms are good depths to preserve in coasting along with a fair wind.

COAST OF THE BENGAL PRESIDENCY.

Manikpatam, in lat. $19^{\circ} 45' N.$, bears about N.E. by E. from Ganjam, distant 14 leagues. The chain of mountains extending along the coast terminates in several saddle-hills to the N. of the latter place, leaving between them and the shore a low, level plain of reddish soil, where it fronts the sea. Ships, in coasting along, may approach the shore occasionally to 10 or 12 fathoms, but it is preferable to keep in from 16 to 20 fathoms. Manikpatam is situated at the entrance of an inlet or small river, leading to the Great Chilka Lake, which is said to extend $10\frac{1}{2}$ leagues along the coast: it may be known by a small pagoda encompassed with other buildings, having near them some trees. From this place a sand bank is said to project 2 m., on which the water shoals suddenly from 10 to 4 fathoms; a ship, ought, therefore, to avoid it in passing, by not coming under 11 or 12 fathoms. From Manikpatam to the Jaggernaut Pagodas the coast extends about E.N.E. 3 leagues; but the pagodas, being a little inland, bear from the former place nearly N.E. by E. $\frac{1}{4}$ E. Between them the coast is low, with a sandy beach, and may be approached occasionally to 10 or 11 fathoms, about 2 or $2\frac{1}{2}$ m. off shore.

The JAGGERNAUT, or POOREE PAGODAS, the largest being in lat. $19^{\circ} 48' N.$, lon. $85^{\circ} 48' E.$; are three large circular buildings, surrounded by several smaller ones; they are of conical form, decreasing in diameter from their bases to their summits, which are crowned with white domes, and an ornamental globe or urn and wind-vane. The W. pagoda is the largest, and the E. one the smallest of the three. They are all nearly in one, bearing W. by N.; when brought to bear N.W., they begin to appear separated; when N.N.W., they are perceived to be distinct buildings, though when seen far off they seem connected. They are situated upon low land, well clothed with shrubs and small trees; and many other white buildings stand near them, of diminutive size in comparison with the largest pagoda.

Black Pagoda, in lat. $19^{\circ} 52' N.$, lon. $86^{\circ} 6' E.$, stands also at a small distance from the sea, and bears from the Jaggernaut Pagodas about E. by N. $\frac{1}{4}$ N., distant 16 m. The coast between them is rather low, having a level and barren aspect, with a steep sandy beach, and may be approached to 10 or 12 fathoms; these depths being from $1\frac{1}{2}$ to 3 m. off shore; but the soundings are not always regular. From 15 to 18 fathoms are good depths to preserve in coasting, about 4 or 5 m. off shore; but caution is requisite in the night, as *then* the low coast is seldom seen, and if the lead be neglected, or *over hove*, a ship's proximity to the shore may be first discovered by the noise of surf on the beach, when the wind comes off the land.

When the Black Pagoda bears N.N.E., it appears like a high rock, rising abruptly at its E. end, in shape of the gable end of a house, and a high pinnacle like a chimney projects upwards from its W. end, from whence it gradually slopes down to the surface of the low land. There are three little clumps of trees or hummocks to the N.E. of it, and one to the S.W., which show their tops just above the white sand-hills that form the sea-coast. This pagoda being situated on even, low reddish land, destitute of trees, and being smaller and blacker than Jaggernaut Pagodas, may be easily distinguished from the latter; in some views the Black Pagoda appears like a huge rock. From the Black Pagoda, the distance to the False Point is 16 leagues, and the course nearly N.E. by E.; but from this pagoda the coast extends $5\frac{1}{2}$ leagues about E.N.E. to the Davy branch of the river Mahanuddy, called also Cuttack River, from the large town of this name, situated on it at a considerable distance in the country.

Davy River mouth, about lat. $19^{\circ} 57' N.$, lon. $86^{\circ} 19' E.$, passing through the Hurrickpoor sub-division of Cuttack district, has of late years been surveyed and frequented by native vessels

carrying rice to the famine-stricken interior. On this branch of the river, a flat of hard ground projects to sea-ward, on which the depth will decrease a little if a ship pass over the tail of it, but there is no danger if she keep 2 or 3 m. off shore, in from 12 to 14 fathoms; and in daylight it may, in fine weather, occasionally be approached to 10 fathoms. Near this place other small branches of the Mahanuddy fall into the sea, forming low islets, and this elbow, or projecting part of the coast, called **Cojung Point**, has sometimes been mistaken for the False Point, as the shore from it takes a N. direction $2\frac{1}{2}$ or 3 m., forming a *small* concavity in the land, called Cojung Bay, nearly mid-way between the Black Pagoda and False Point. The whole of the coast is low to the N.E. part of this small bay, and from thence it stretches N.E. $\frac{1}{2}$ E. and N.E. about 5 leagues to the False Point, very low land. From Cojung Point to False Point, the distance is about 6 leagues. The coast in this space may be approached to 10 or 11 fathoms in fine weather, or occasionally, when working in the day-time, or with the wind from the land, a ship may stand at times into 8 or 9 fathoms, about 2 m. from the shore, the soundings being most regular. Ships passing from the Black Pagoda to the False Point generally keep in 14 and 15 fathoms, which is preferable to borrowing nearer the land; particularly with unsettled weather in the night, or with the wind from sea-ward, it is prudent not to come under 13 or 14 fathoms. Between the Black Pagoda and False Point there are 40 and 45 fathoms on the edge of the bank of soundings, about 5 or 6 leagues off shore: near the point, soundings extend farther out.

FALSE POINT, in lat. $20^{\circ} 22' N.$, lon. $86^{\circ} 49' E.$, is low and woody, fronted by a long and extremely narrow island, called Dowdeswell Island, which extends from about a mile S. of the light-house to about 5 m. N.E. of it, forming to the N. of the Point a bay, in the centre of which is a small island, called Plowden Island. The bay, called **False Bay**, is very shallow, having not more than from 2 to 6 ft. in it, except in the channels leading from the Mahanuddy River; one of which has lately been surveyed, and found to have capacity to admit vessels drawing 12 ft. water.

Light. The Light-house stands about 2 m. S.W. of the Point, in lat. $20^{\circ} 20\frac{1}{2}' N.$, lon. $86^{\circ} 47' E.$ The building is coloured red or reddish brown, with a large *white* star in the centre, and exhibits a *fixed* light 120 ft. above H. W. The light may be seen 18 m. from a vessel's deck if elevated 15 ft. above the sea. Vessels are recommended not to come under 8 fathoms, for the purpose of *making* the Light-house or Light, and having sighted it, to deepen their water again from 13 to 18 fathoms, according to circumstances, on steering to the N.E. for the purpose of getting a pilot.*

PORT OF CUTTACK. To the N. of the False Point Island and bank is False Bay, which has all over it a soft bottom of green mud, with regular depths decreasing gradually to the shore; but at the N. part the quality of the ground changes from soft mud to a mixture of sand and mud, with rotten stones and broken shells, on the S. edge of the extensive sand-banks and reefs environing Point Palmiras. A little to the N. of False Point, two branches of the river Mahanuddy fall into the sea, and farther to the N. are two sand-hills: all the coast but these is low and woody. Subsequently to the Orissa famine of 1867, this bay to the N. of False Point was surveyed, and ships have taken cargoes of rice there from Chittagong and other ports. Beacons and buoys have been laid down, and thus False Bay has been constituted the Port of Cuttack.

POINT PALMIRAS (called by the natives **Mypurra**, from the contiguous sandy island of this name), in lat. $20^{\circ} 44' N.$, lon. $87^{\circ} 1' E.$, bears from the False Point about N.E. by N., distant $8\frac{1}{2}$ leagues; but from being abreast the latter in 14 or 15 fathoms, with it bearing W.N.W., the direct course is about N.E., and the distance 10 leagues to the outer edge of the bank off Point Palmiras in the same depth, with the Point bearing W.N.W. Ships must be guided by the soundings in passing between them, as the flood sets *towards*, and the ebb *from* the shore: from 14 to 15 fathoms are good depths to preserve with a fair wind. The land of Point Palmiras is low, and clothed with Palmyra trees, having on each side of it, at a small distance, the mouth of a river: that on the S. side is navigable by boats or small vessels. In rounding the bank off the Point, the trees on the land are just discernible (from aloft) in 15 fathoms, water, distant about 5 or 6 leagues from the shore: ships, therefore, seldom see the Point in passing, unless the weather be clear, and the reef approached under 14 or 15 fathoms, which ought never to be done in a large ship during thick weather, or in the night.

Palmyras Reefs. Shoal banks extend off Point Palmiras to the distance of about 12 m., having channels between them leading to the entrances of the rivers near the Point. What was formerly called Mypurra Island is a mere sand-bank. The banks have on them from 1 to 5 fathoms, the water deepening rather suddenly to the E. of them from 4 to 10 and 14 fathoms: to the N. and S. the decrease is more gradual. The S. part of these banks is more flat than any other part of

* Directions for proceeding to the pilot station will be found in the subsequent chapter.

their exterior limit; for here the depths gradually decrease, and their boundary on this side can only be known by the change of ground, from soft mud in False Bay, to a mixture of coarse sand and mud, with rotten stones and broken shells upon the edge of the banks.

A ship passing False Bay in daylight, with a W. wind, may steer along at discretion in 10 or 12 fathoms; but if she get into 9 fathoms and see Point Palmiras, she ought instantly to haul out into 12 or 14 fathoms in rounding the E. limit of the bank. When blowing strong from S.W. or S., a ship with daylight, after rounding the banks off Point Palmiras, may haul to the W. and anchor to the N. of the banks in 10 fathoms, or rather less water, where she will be sheltered by them until the force of the winds is abated. The light-house, which was formerly a guide to vessels rounding the banks off Point Palmiras, has long since been undermined by the sea. Therefore, in the absence of land-marks, the lead must be the guide to all vessels along the bank of soundings off Point Palmyras, called the Pilot's Ridge.

Kannika, or Kunka River, to the N. of Point Palmyras, is about a mile wide at the entrance, having a channel of approach to it between the sand-banks of 7 m. length, in which the depths vary from $1\frac{1}{2}$ to 3 fathoms. The entrance of this channel is indicated by a buoy on its N. side, which lies in about 4 fathoms, at the distance of 6 m. from the nearest shore. The depths within the entrance of the river are 2 and 3 fathoms, and it appears that, with a pilot, vessels drawing under 12 or 13 ft. may sail into the river at H. W. Kunka River is much frequented by small vessels navigated by natives, who trade from hence to Calcutta, Chittagong, Madras, and places on the Coromandel coast, during the favourable monsoon. Trading boats from the Maldivé Islands also make their appearance here once in the year, as at Coringah and Ballasore. Dhumrah River, to N. of the Kunka, and dividing Cuttack from Ballasore, admits vessels drawing 12 or 13 ft. and is visited by native craft for rice and grain.

Tides. At Point Palmiras, and the entrance of Kannika River, it is H. W. about 9 or $9\frac{1}{2}$ h. on F. and C. of moon; the rise of tide 10 or 12 ft. on the springs, and 7 or 8 ft. on the neaps.

Churinga, or Churrimoon Creek, bears from the entrance of Kannika River nearly N.N.W., distant about 7 leagues: the coast between them is low, and to the N. of Kannika River a flat, dry in some places at L. W., extends about 4 m. from the shore; the depths towards the outer edge of it decreasing gradually to 2 fathoms. The Bay of Churinga, called also Kannika Bay, affords good anchorage in the S.W. monsoon, to the N.W. of Kannika Flat; but the shore is fronted by shoal water, there not being more than 3 fathoms at the distance of a league from it, and being out of the track of ships bound into Hoogly River, the anchorage under the island off Point Palmiras is preferable. At Churinga Creek the coast forms a curve, taking a direction from thence nearly N.N.E., and N.E. by N. about 8 leagues to Bulramgurry, at the entrance of Ballasore River: between them there are other small rivers or creeks, and all the coast is low, with a flat stretching along it, on which the depths are not more than $2\frac{1}{2}$ or 3 fathoms nearly 2 leagues from the land: and in some places the banks are dry at L. W. a mile from the shore.

BALLASORE RIVER, the entrance, is in lat. $21^{\circ} 28' N.$, lon. $87^{\circ} 3' E.$ From the Point, all the low coast is planted with trees until within 2 or 3 m. of the entrance of this River, which on both sides is destitute of them, having a sandy barren aspect; by this it may be known, particularly by the small sand-hills on the N.E. side. When the Nilgurr Hills, situated inland to the W., are seen, they answer as a good mark for a ship having occasion to proceed to the anchorage. With the extremity of the S. or Long Hill W. $\frac{1}{2}$ S., the peak of the middle one appearing highest and separated from the others W.N.W., or W. by N. $\frac{1}{4}$ N., the smallest to the N.E. bearing N.W. by N. $\frac{1}{4}$ N., the smallest to the N.E., bearing N.W. by N., a ship will have a good berth in 5 fathoms, mud, with the entrance of the river about N. by W. off shore nearly 10 m. The bank here is very flat, the depths being $2\frac{1}{2}$ and 3 fathoms about 4 or 5 m. from the land. From the anchorage in 5 fathoms the peak of the Nilgurr Hills bears W.N.W., distant 20 m.; and from Balramgurry, at the river's entrance, it bears W. $\frac{1}{4}$ N., distant 14 m.

A boat proceeding for Ballasore River should carry a compass, and in crossing the bar, ought to bring the flag-staff at Bulramgurry or the Banks-hall House, N.N.W.; keeping it on this bearing will lead her to the outer beacons, which are poles placed on each side of the bar. From hence, the channel lies directly towards the S.W. point of the River, where the passage is marked out by beacons or poles on each side, placed at convenient distances on the shoals. At F. and C. of moon, it is H. W. about 10 o'clock, and the tide rises from 12 to 15 ft. in common springs; but there is not more than 2 or 3 ft. on the bar at L. W. in the dry season; it is therefore proper not to attempt to pass over until the last quarter-flood, for the sea breaks high upon it during the first quarter-flood, particularly in the S.W. monsoon. The chart shows a buoy off the entrance, which bears S.E. $3\frac{1}{2}$ m. from the flag-staff.

Peply, or Soobunreeka River, in lat. $21^{\circ} 34' N.$, bears E.N.E. from the entrance of Ballasore

River, distant 5 leagues; it is known by a pagoda on the W. side of the creek, having near it a tope of trees. Small vessels passing between these places may steer along the coast in 4 fathoms, about 5 m. from the shore, and when the pagoda bears N., they may haul in near the entrance of the creek, where there are 2 fathoms at L. W. between it and the sand. Pepley, having been superseded by Ballasore, is now an insignificant place; but the river runs up to Jellasore, a large town, about 20 m. further up. Pepley Sand stretches S. 5 m. from the creek, having 3 fathoms on its outer part, but is nearly dry at L. W. about 2 m. off the land. A ship intending to anchor in Pepley Road, to the E. of the sand, ought to steer round its S. end in 8 or 9 fathoms, and when the pagoda is brought to bear N.N.W. she may begin to haul up to the N.E., on the E. side of the sand, and anchor with the pagoda bearing N.W. by N., in 5 fathoms, water. From Pepley River to Ingellee, or Hidjlee, in lat. $21^{\circ} 46'$ N., the direction of the coast is first E. by N. $\frac{1}{4}$ N., and then about N.E. by E.: the whole of it is low, and interspersed with sand-hills. The small trading vessels from Ballasore keep close along the coast between Pepley and Ingellee, in a little channel, with 2 or 3 fathoms in it at L. W., formed between the sands and the shore.

Ballasore Road, which is the name generally given to the extensive bay formed between Point Palmiras and the banks at the entrance of the River Hoogly, affords good anchorage, the bottom being mostly stiff blue clay, intermixed with sand at times, or small stones. During unsettled weather in the S.W. monsoon, it may frequently happen that a ship cannot round the reef off Point Palmiras so near as intended, to enable her to anchor on the N. side of it in smooth water; in such case she ought, when round the reef, to haul to the N.W. into 15 or 14 fathoms, and anchor. Here ships ride easier and more safe than farther to the E.; being in deep water, the sea runs fair, whereas it runs high and short about the sea-reefs, and in the channels between them, with stronger tides than in the road.

THE PILOT'S RIDGE is an extensive bank of soundings, stretching from the Cuttack coast towards the Pilot Station at the entrance of the Hoogly. Since 1851 a **light-vessel** (a pilot-brig), shows a *fixed* light from the fore-yard-arm, on the N.E. part of the Pilot's Ridge Bank, moored in $21\frac{1}{2}$ fathoms, in lat. $20^{\circ} 50'$ N., lon. $87^{\circ} 41'$ E., distant 21 leagues N.E. by E. from False Point Light-house; from the 15th March to the 15th Sept. burns a blue light every hour, a maroon at the intermediate half-hours, and also fires a gun on sighting any vessel; a buoy is placed a little to the E. of the Ridge light-vessel. The pilot-vessels on the above date take up their station near the buoy.

A vessel, therefore, after making the light-house on False Point (in passing which she ought not to go into less than 12 fathoms), should bring it to bear about W.S.W. 10 or 15 m. distant, when she will be in 11 or 12 fathoms; and then steer E.N.E., when the soundings will gradually increase to 23 fathoms on the E. edge of the Pilot's Ridge. She should then regulate her course so as to keep between the ridge and the depth of 27 fathoms; when, by attention to the lead and to the nature of the soundings, as well as to the course and distance run, it will be almost impossible to miss the pilot-vessels, as their cruising-ground is immediately to the N.E. of the light-vessel, which, during the S.W. monsoon, is stationed close to the buoy on the ridge. The soundings to sea-ward of the ridge, are, in general a greenish or olive-coloured mud, with occasionally a few bits of broken shells mixed with it; while those on the ridge are of a shelly sand, or minute gravel, of a reddish, or rusty-brown colour. Vessels approaching the station are warned to be careful in avoiding collision, when either communicating with the light-vessel, or the supplying Pilot-vessel: and on making the former at night, they are recommended to heave-to, at a proper distance, till daylight, by which they will avoid the probability of passing the supplying Pilot-vessel in the darkness of night.

APPROACHING CALCUTTA SAND-HEADS from MADRAS COAST. When the S. winds begin to have strength during the latter part of March, or early in April, the weather is generally hazy, preventing the land from being discerned, unless it is very near; nor can observations be always obtained. It is therefore proper for ships bound to the Hoogly River in the strength of the S.W. monsoon, to fall in with the coast of Orissa to the S. about Pandy, or between it and Ganjam, where the land is of considerable height. They ought certainly not to exceed the latitude of Jagernaut Pagodas, in lat. $19^{\circ} 47'$ N., before getting in with the coast. They will be discerned from 17 or 18 fathoms, although the weather is hazy, but with a commanding breeze in daylight, the coast hereabout may be approached with safety to 12 or 13 fathoms, about 3 or 4 m. from the shore. As the land is low and sandy close to the sea, it will not be seen in the night, unless a ship is very near; and in hazy weather, the noise of the surf on the beach would probably be the first indication of danger; it is therefore prudent, in the night, not to come under 15 fathoms, nor to deepen above 17 or 18 fathoms, which depths may be preserved by attending to the lead and

running under easy sail. The Davy, or Debni River Mouth, is about 5 leagues to E.N.E. of the Black Pagoda. Being 3 or 4 leagues past the Black Pagoda, a direct course about N.E. by E. should be followed, to obtain the proper soundings off False Point, taking care not to haul into Cojung Bight or Bay, about half-way between them. The depths decrease gradually towards the bank surrounding False Point. When abreast of that point, in 14 or 15 fathoms, the bottom in some places is coarse brown sand and shells, with black specks; in other places, mud and sand; but to the N. of this point, all over False Bay, the bottom is very soft, green mud.

With False Point Light-house bearing W.N.W., in 14 or 15 fathoms, the course is N.E. 10 leagues, to clear the bank off Point Palmiras; but as the tides affect a ship laterally, she ought to keep in 14 or 15 fathoms with a commanding breeze, or in 16 fathoms if the wind is S.E. For rounding both False and Palmiras Points, 15 fathoms is a good track, also in crossing the bay between them: this depth is far from danger off the former, and also when Point Palmiras bears well to the N.; but when this point is bearing to the S. of W., the 15 fathoms track is not far from the edge of Palmiras Reef; for here the water shoals suddenly from 10 to 7 fathoms, then to 3 fathoms in some places. It may be observed, that the water will not deepen in steering N.E., from having 15 fathoms off the False Point; but in steering the same course from having 15 fathoms on the edge of the bank off Point Palmiras, the water will deepen gradually to 17 and 18 fathoms; she ought then to haul to the N.N.W., or N.W., until she get into 16 or 15 fathoms, in which depths the pilot-vessels used generally to anchor at night during the S.W. monsoon, in Ballasore Road. If blowing strong at S.W. in rounding Palmiras Reef in daylight, a ship may steer along the edge of it in 12 or 14 fathoms, taking care not to approach the N.E. part under 12 or 13 fathoms, where it is dangerous and steep under 10 or 11 fathoms. When round that part, she may haul to the N.W., and anchor to the N. of the Mypurra Sand, where she will be sheltered from the sea by the reef. If a ship haul up too soon for Ballasore Road, the water will shoal suddenly on the N.E. edge of the reef, over a sandy bottom; she ought in such case to edge out immediately into 15 or 16 fathoms, the bottom then in the fair track will soon change to stiff, blue clay, mixed with sand and stones, or at times with shells; and this is in general the quality of the ground to the N. of Point Palmiras, in the Bay of Ballasore.

The difficulty of rounding Palmiras Reef necessitated the removal of the Pilot Station from off Point Palmiras to a position about 15 m. W.S.W. of the outer Floating Light. The New Pilot Station between the South Channel Buoy and the Pilot's Ridge, adopted for the past thirty years, can be made by vessels from False Point with great facility, and pilots can also be readily supplied there. Therefore this latter station has been continued during the S.W. monsoon; viz., from March 15th to Sept. 15th. No difficulty can possibly be felt in passing from False Point to the present station, if common attention be paid to the lead and to the directions, prepared by Captain Lloyd, Marine Surveyor-General.

The South Channel Buoy, in lat. $20^{\circ} 59' N.$, and lon. $88^{\circ} 4' E.$, bears from False Point Light-house about N.E. by E. by compass, distant 83 m., and is laid in 12 fathoms. A bank of soundings extends from off Point Palmiras in a direction towards the tail of the W. Sea Reef, and the nature of the bottom (as distinguished from that of the Hoogly Deposit, which is sand and mud, with shining specks) is a gravelly substance composed of sand, shells, and small pebbles, discharged from the Kunka and other rivers near Point Palmiras, the lighter material of which being carried farther out, is deposited, and forms what is called the **Pilot's Ridge**, which, in crossing to the N.W., shows a little less water than on either side. In coming from sea-ward, you shoal rather suddenly from 28 to 23 fathoms, upon its E. edge. It is composed of a shelly sand, or minute gravel, of a reddish or rusty-brown colour.

Vessels approaching the station during the day are required to show the usual signal for a pilot, and by night to give as early and as much warning as possible by firing guns, burning blue lights, and by exhibiting two lights in a vertical position, where best seen; but commanders are strictly enjoined to avoid as much as possible making the station during the night. Ships have been lost from running for the Pilot Station in dark, or threatening, or actually bad weather. In such weather, the pilot-vessels cannot be made out: and if fallen in with, cannot board the inward-bound vessel, nor could the pilot take her in, if he was on board. No advantage, then, is gained by attempting to get a pilot in such weather, while the danger is imminent. It is strongly recommended, therefore, to commanders, under such circumstances, to put their ships under snug canvas while well out in deep water, and keep to sea.

Pilot's Ridge Light-vessel. To mark the station, in lat. $20^{\circ} 50' N.$, lon. $87^{\circ} 41' E.$, one of the pilot-vessels will show during the day a large St. George's jack, (*white with red cross*) at the main-top-gallant mast-head, and a *good mast-head light* during the night, and will burn a blue light and a maroon alternately every half hour, and fire a gun at 8 p.m., at midnight, and at 4 a.m.

The light-vessels are directed, when a vessel is approaching during the night, to show a light at the gaff end, to mark the way they are riding.

Vessels approaching the station, and while there, as well as when approaching the light and buoy station-vessels, are warned to be careful in avoiding collision by night or by day; and in communicating with either of the above vessels, either at anchor or hove-to, when it is necessary to cross her, to pass under the stern; several instances of serious damage having occurred during the S.W. monsoon, whereby the outer floating light was more than once compelled to leave her station for repairs, to the great inconvenience and risk of vessels entering and quitting the river.

The pilot-vessels are generally snow-rigged, with a small jigger-mast on the stern, and the first that is spoken with by any ship (if it is not their *turn* to take charge) they will direct her where to find the pilot, whose vessel will show a small *red* flag at the gaff end. At *present*, pilot-vessels in the N.E. monsoon are found at the entrance of the Eastern Channel, and they generally anchor on the E. Sea Reef at night, or during the flood in the day. At times a pilot-vessel may be found to the E. of Saugor Sand, or to the W. of the W. Sea Reef, on the look-out for ships that have deviated from the common route: but *now* they are generally found at the tails of the reefs. If a ship get accidentally on the tail of any of the sea reefs, she ought not to stand into shoal water, for the sea runs high upon them in the S.W. monsoon; it will be prudent to tack or haul off immediately into deep water, or anchor until the ebb-tide enables her to work to the S. clear of them.

In Sept., when the strength of the monsoon is abated, it is not considered dangerous to stand to the E. in 12 or 11 fathoms, near the tails of the sea reefs, particularly in favourable weather; by doing so pilots may at times be found, bringing out ships by the Eastern Channel; but it is only when no pilots are found in the road, and the weather settled, that a ship may venture to stand near the tails of the sea reefs in search of one, and it ought not to be done in the months when the S.W. monsoon generally blows strong.

Eastern Channel. Since the Western Channel has become dangerous for large ships, by a decrease in the depth of water, and the Eastern Channel now adopted, the pilots, to enter the latter, in conducting ships from Ballasore Road in the S.W. monsoon, steer to the E., crossing over the tails of the W. and E. Sea Reefs, the soundings obtained on these being their principal guide. The judicious navigator, with the chart before him, and attention to the directions, may proceed with confidence in case of necessity.

TIDES OF THE RIVER HOOGLY.

Tides. In the Eastern channel the tides set as follows, when uninfluenced by the wind:—

1st Quarter Flood, N.W. by W.; 2nd Quarter, N.N.W.; 3rd Quarter, N.N.E.; last Quarter, E.N.E.

1st Quarter Ebb, S.E. by E.; 2nd Quarter Ebb, S.S.E.; 3rd Quarter, S. by W.; last Quarter, S.W. and W.S.W.

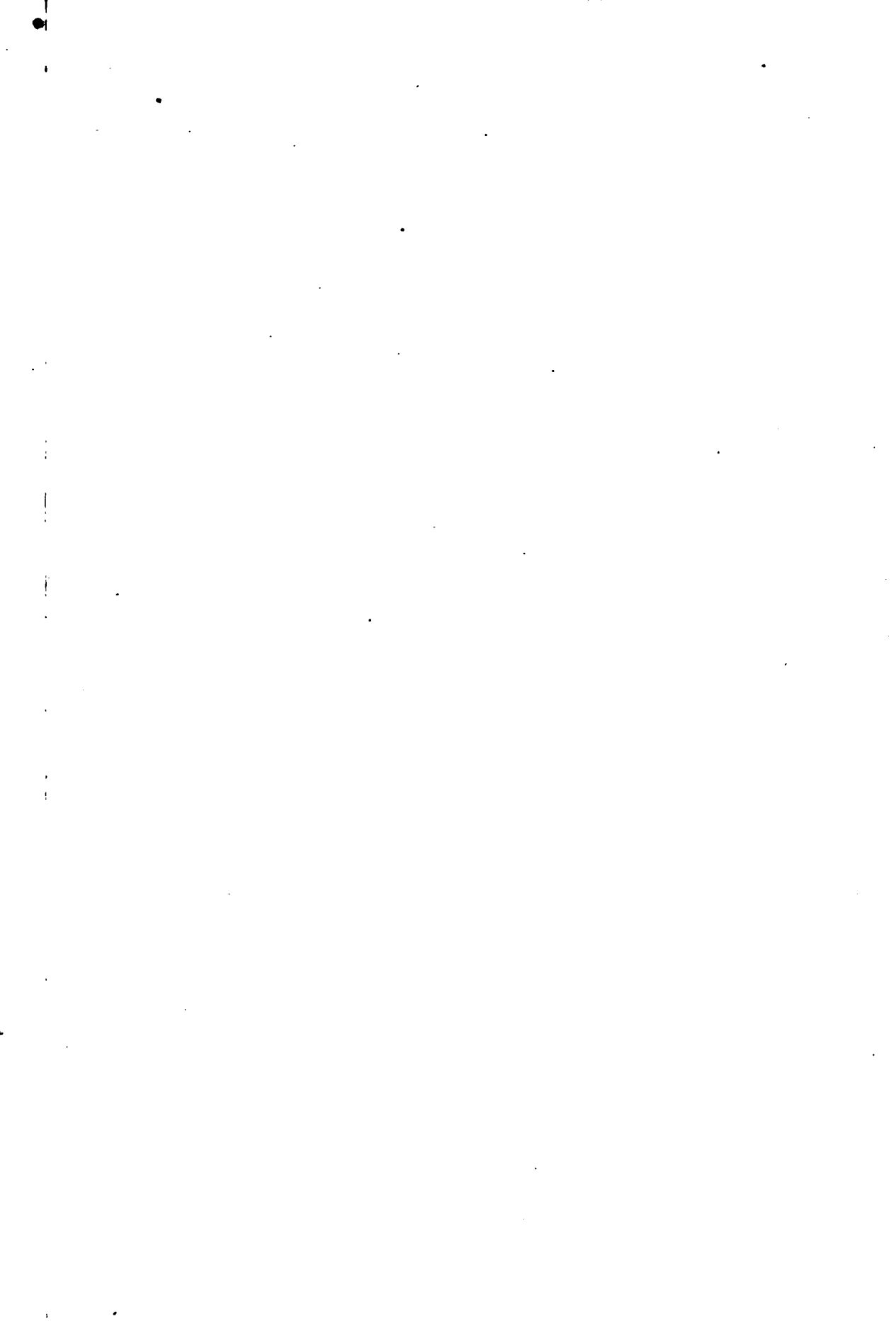
The great body of the tide runs in the direction of the channels, at the rate of 2 or 3 knots on the springs, and 1 and $1\frac{1}{4}$ knots on the neaps; the greatest rise and fall at the Upper Floating Light being 12 or 13 ft., and at the Lower Floating Light 9 ft. It is H. W. on F. and C. of the moon at about 9 h.

The Tides in the River Hoogly run with great rapidity on the springs, sometimes above 7 m. an hour between Saugor and Calcutta, but not so strong in the channels outside. They flow highest during the S.W. monsoon, the rivers being swelled by the rain which falls in the interior, and the ocean water impelled against the shores by strong S. winds adds to the rise of the tides in this season; whereas the N. winds blowing from the land in the N.E. monsoon facilitate the progress of the water from the rivers; for then the quantity of water is less, with a smaller rise and fall of tide in the day-time, than in the S.W. monsoon. Strangers should be careful when passing between Calcutta and the lower parts of the river in boats *during the night*, for many lives have been lost through the apathy and neglect of the country boatmen, in running foul of vessels anchored in the stream, when by the rapidity of the tides the boats were immediately upset or broken in pieces. To avoid an accident of this kind, it is prudent, in proceeding upward with the flood, to keep near one of the sides of the river, out of the track of ships or large vessels which happen to be at anchor.

At Calcutta it is H. W. *about* 2 h. 30 m. on F. and C. of the moon, the difference of time, between it and the tail of the E. Sea Reef, being $5\frac{1}{2}$ h.; so that it is nearly H. W. at the former place when it is L. W. at the sea reefs.

The Bore, in the River Hoogly, is occasioned by the rain in the country imparting greater velocity and duration than usual to the tide of ebb, to overcome which, an excessive effort is made by the first of the flood, producing that sudden and abrupt influx called the Bore. It is seldom perceptible in the N.E. monsoon, except when the tides are higher than usual; but about the equinoctial tides, in March, it is at times high and dangerous. From May to Oct., when the river is greatly elevated, the Bore frequently prevails for several days at the height of the springs; it is first discernible on the Diamond Sand, below Diamond Harbour, and becomes more conspicuous on the sands at Hoogly Point, a few leagues farther up, where it meets with great resistance by the sudden bending of the river to the W.: from thence it runs high over all the principal sands as far as Hoogly Town, distant near 70 m., employing hardly four hours to travel this distance; and its general velocity is nearly 20 m. in the hour. On the sands contiguous to the banks of the river, the Bore rises in a large wave, sometimes 12 or 15 ft. perpendicular, and rolling along with great noise as the harbinger of the flood-tide, carries every floating body along with it, and will upset any boat or small vessel that may happen to be on the sands, or in shoal water near them. It is discernible in the day at a considerable distance, and the roaring noise indicates its approach in the night, when instantly all boats in shoal water should quickly pull farther out into deep water for safety, where the waves do not break, the water being only much agitated with a confused swell.

At Calcutta the shore is steep, with deep water near it; here the boats do not all leave the shore when the Bore is approaching, but the people stretch a rope upon the land and haul them as far in as possible, when they are lifted up by the great swell of water occasioned by the Bore, which at times rises instantaneously to the high-water mark of neap-tides. Europeans should be cautious in the night, if upon the river, or crossing it in boats near L. W. spring tides, when the Bore is liable to happen; they ought to keep in deep water, for if it approach when they are aground on any of the sands, or in shoal water near them, they will be in the greatest danger of perishing.



INDIAN OCEAN
DURING
JANUARY, FEBRUARY & MARCH,
OR THE
LAST HALF OF AUSTRAL SUMMER.

TRACKS
Outward Bound ———
Homeward Bound - - - - -
SYMBOLS ARE EXPLAINED IN
CHAPTER XX.

The Vertical Sun's mid-month position.

CAPE COLONY

From Europe

The Great Circle

Icebergs and Low Ice may track

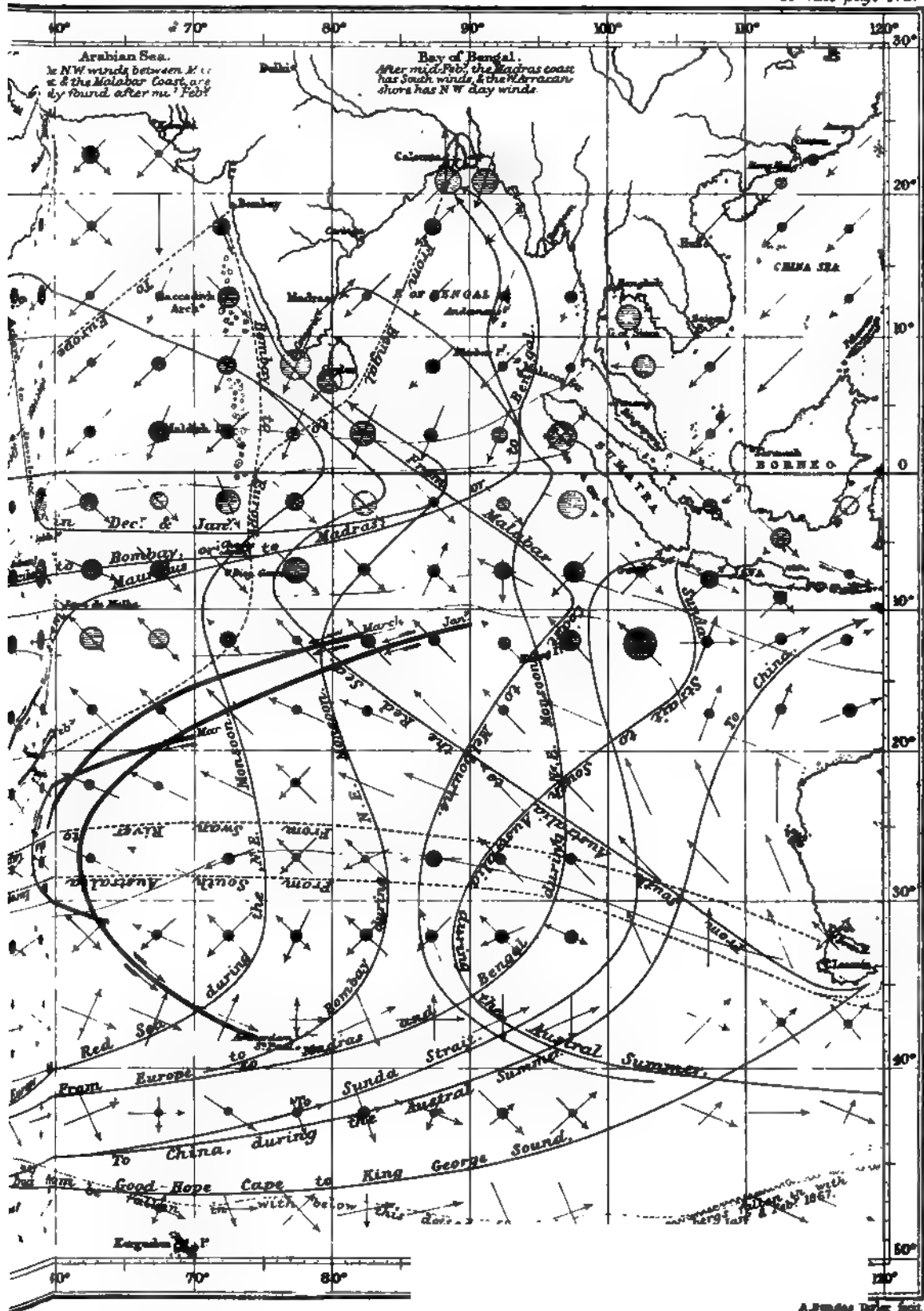
WIND AND PASSAGE CHART
FOR SAILING VESSELS ONLY.

TRACKS
Outward Bound _____
Homeward Bound _____
SYMBOLS ARE EXPLAINED IN
CHAPTER XX.

~~The Vertical Sun's mid-monthly position.~~

WIND AND PASSAGE CHART FOR SAILING VESSELS ONLY.





CHAPTER XVI.

CALCUTTA TO BURMAH.

CALCUTTA—RIVER MUTLAH—SUNDERBUNDS—MORRELLGUNJ—GANGES AND MEGNA RIVERS—SUNDEEP ISLAND—CHITTAGONG—KOOTUBDEAH AND MASCAL ISLANDS—ELEPHANT POINT—NAAF RIVER—ST. MARTIN'S ISLAND—AKYAB—OYSTER REEF—KYOUK PHYOO—CHEDUBA—GWA—CAPE NEGRAIS—BASSEIN—ALGUADA REEF—IRRIWADY RIVER—RANGOON—MOULMEIN—KALEGOUK—MOSCOO ISLANDS—TAVOY—TENASSERIM—MEBGUI ARCHIPELAGO—HASTINGS HARBOUR—PAK-CHAN RIVER—SIAM FRONTIER—PREPARIS AND COCOS—ANDAMAN AND NICOBAR ISLANDS.

(VARIATION AT CALCUTTA, 2° E.; AT RANGOON, $2\frac{1}{2}^{\circ}$ E.; AT PAK-CHAN, 2° E.)

Notice to Mariners.—Signal Stations in the Hoogly. The following Act to enforce the hoisting of Signals of the Names of Vessels passing Signal Stations established on the River Hoogly and the branches thereof, was published in 1862:—

1. The master of every inward, or outward-bound vessel, on arriving within signal distance of any signal station, established within the limits of the River Hoogly, or within the limits of any channel, which may be made subject to the provisions of Act XXII., of 1855, shall, on the requisition of the pilot who may be in charge, signify the name of the vessel, by hoisting the number by which she is known, or by adopting such other means to this end as may be practicable and usual, and shall keep the signal flying until it be answered from the signal station.

2. Any master who shall refuse or neglect to conform to the above rule, shall be liable on conviction, for each instance of refusal or neglect, to a fine not exceeding 1,000 rupees.

3. Every pilot shall require the number of the vessel of which he is in charge to be duly signalled, as provided under Section 1 of this Act. When on a requisition from the pilot to that effect, the master, not employed in the service of Government, shall refuse to hoist the number of a vessel, or to adopt such other means of making her name known as may be practicable and usual, the pilot in charge of such vessel may, on arrival at the first place of safe anchorage, anchor, and refuse to proceed on his course, until the requisition shall have been complied with.

4. Any pilot in charge, who may be proved guilty of neglect to obey, or of connivance with the master in disobeying the provisions of this Act, shall be liable to a penalty not exceeding 500 rupees for each instance of neglect or connivance, and in addition shall be liable to dismissal from his appointment.

THE SANDS, REEFS AND ISLANDS at the entrance of rivers like the Hoogly, are necessarily subject to such great and rapid changes, that any attempt at a *minute* description of them would be more mischievous than useful; a general notice of their extent and position is all that can be given. The **W. Brace** begins at the parallel of $21^{\circ} 40'$ N., near Sola Creek, about 2 m. from the shore, and extends in the form of a crescent, having its convex side to the W., to lat. $21^{\circ} 12'$ N. On the N. part it is very shoal, and about 2 m. broad, but becomes between 3 and 4 m. wide in the middle, where the depths are from 2 to 3 fathoms at L. W., gradually increasing to 7 or 8 fathoms on its S. extremity, where it is insensibly lost in 9 fathoms, soft ground. The **E. Brace** is about 3 m. to the E. of the former, and appears to be an extension in a S.W. by S. direction of the bank on the S. side of the Ingellee River. Its greatest width is between 4 and 5 m., and its S. extreme is in lat. $21^{\circ} 22\frac{1}{2}'$ N., with depths on it from 1 to 4 fathoms. The **W. Sea Reef**, hereafter described, is a continuation of this bank. The **Barabulla**, and other smaller and parallel sands, lie to the E. of the E. Brace, dividing the N. part of the great Western Channel into several smaller ones. The **Long Sand**, which with its S. continuation, called the E. Sea Reef, forms the E. side of the Western Channel, extends to the N. as far as Kedgerree, where it terminates in a low island now covered with grass; its average width is from 1 to 2 m. There are patches on its N. part, which are dry at L. W. The portions of the sand to S. of Saugor Island project S. by E. in parallel ridges, forming between the Saugor Sand and the E. Sea Reef the passages called Gaspar and Thornhill Channels.

The **W. Sea Reef** is a continuation of the **E. Brace**, extending nearly S.S.E. to lat. $21^{\circ} 0' N.$ It is in general about 4 m. broad, the depths at L. W. $1\frac{1}{2}$ and 2 fathoms on the N. part, deepening gradually to 3 and 4 fathoms farther S., to 7 fathoms on the S. extremity.

THE E. SEA REEF, stretching out more sea-ward than any of the others, being a continuation of the Long Sand and of the Gaspar Sand, extends about S.S.E. to lat. $20^{\circ} 58' N.$, the tail of this reef being distant about 10 m. from that of the W. Sea Reef, forming between them the **Western Channel**. The depths on the sand gradually increase from $1\frac{1}{2}$ fathoms on its N. end to 3 and 4 in the middle, and thence to 9 and 10 fathoms at its S. extreme. Its general width is between 3 and 4 m. Upon the Sea Reefs the bottom is hard sand, with bright specks like steel filings; and on the ebb-tide, or near L. W., the lead rebounds from it similar to striking on a rock. The difference in depth between H. W. and L. W. on them at spring-tides, is generally about 10 or 11 ft.; and the water is highest over the ground, upon the Sea Reefs, and in Ballasore Road, about 9 or $9\frac{1}{2}$ h. on F. and C. of moon. From 7 to 8 leagues S. of the tails of the Sea Reefs, the depths are from 50 to 60 fathoms on the outer edge of soundings: from thence the decrease is regular over a bottom of soft mud, to 9 and 10 fathoms close to their tails; and sudden to 6 and 7 fathoms, hard ground upon them.

Saugor Sand extends from the S.E. part of Saugor Island about S.S.E., in a parallel direction to the Eastern Sea Reef, and terminates on the meridian of $88^{\circ} 18' E.$, in lat. $21^{\circ} 6' N.$, where the depth is 5 fathoms. It is very dangerous, with patches dry at L. W. towards the land, and there is not more than 5 or 6 ft. on it at L. W., for a great distance to the S. The quality of the bottom is hard sand, mixed with bright specks like steel-filings, but rather of a darker colour than the Sea Reefs. The Outer Light-vessel is now 6 m. to the S.W. of the W. tail of Saugor Sand, but the E. tail is about 9 m. to the E. of the Light-vessel; and therefore ships, coming from the E. in the N.E. monsoon, cannot now (as formerly) mistake the hard soundings they get on it for the soundings of the E. Sea Reef, and work up in Lacam Channel, on the E. side of the Saugor Sand. That Sand may be considered as the *third* reef that extends far out into the sea; the W. Sea Reef being the first, the E. Sea Reef the second, and Saugor Sand the third reef, forming between them the E. and W. entrance-channels. **Saugor Island** extends N. and S. from lat. $21^{\circ} 35' N.$ to $21^{\circ} 56' N.$, and bounds the great entrance of the River Hoogly on its E. side. It is 21 m. in length and 6 in breadth, and like all the land hereabout is generally low. The Barratulla River, generally called the Channel Creek, separates it from the other land, and it is itself divided into several portions by narrow creeks; the S. part of the island bears the name of Gunga Saugor. **Subtermooky Sand** projects from the entrance of the Subtermooky River in a S.S.E. direction 30 m., forming the E. side of Lacam Channel; and from Bulcherry Island at the entrance of the Jumera River, the **Bulcherry Sand** projects nearly the same distance in the same direction, forming a channel between them leading to the entrance of both rivers. To the E. of the Bulcherry Sand lies the W. channel into the Mutlah River, off which is placed a *temporary* light-ship, moored in 9 fathoms, in lat. $21^{\circ} 6' N.$, lon. $88^{\circ} 48' E.$

LIGHTS. The **Pilots' Ridge Light** (during S.W. monsoon only), in lat. $20^{\circ} 50' N.$, lon. $87^{\circ} 41' E.$, shown by a Pilot Brig, which by day hoists a *White* flag with *Red* cross, has been described at page 472.

The **Lower, or E. Channel Light-vessel**, in lat. $21^{\circ} 3' N.$, lon. $88^{\circ} 15' E.$, moored in $8\frac{1}{2}$ fathoms, at L. W., shows a *fixed* light. Between March 15th and Sept. 15th, she burns a Blue light every half hour, and a maroon torch at the quarters, commencing at 7 h. p.m. From Oct. to March (the N.E. monsoon), she burns a maroon torch every half hour, and a Blue light every hour. In the S.W. monsoon, she is moved more to sea-ward into lat. $21^{\circ} N.$ The **Pilot Station** is between this light and the Pilot Ridge.

The **Upper, or Gaspar Channel Light-vessel**, showing also a *fixed* light, is moored in $3\frac{1}{2}$ fathoms (L. W. depth) at the distance of 8 leagues to N. by W. from the Lower Light-ship. Its position is sometimes slightly altered as the channel shifts; but it is about lat. $21^{\circ} 26' N.$, lon. $88^{\circ} 7' E.$, or 12 m. on a S. by E. $\frac{1}{4}$ E. bearing from Saugor Light.

Saugor Light. In 1852 an iron light-house was erected on Middleton Point, in lat. $21^{\circ} 38\frac{1}{2}' N.$, lon. $88^{\circ} 3\frac{1}{2}' E.$; exhibits a *fixed* light *flashing* every twenty seconds, 88 ft. above H. W., and visible from 4 to 5 leagues; it is situated about 200 yards from L. W. mark, and the light-house is roofed with copper. The **Electric Telegraph** extends from hence to Calcutta, by which vessels are reported on showing their number, or any communication required. Fresh provisions and water can be obtained, by application to the superintendent of the light-house.

Cowcolly Light. On Kaokali Point, bearing N.N.W. $\frac{1}{4}$ W. 13 m. from Middleton Point, stands Cowcolly, or Kedgerree *fixed* light, 62 ft. above H. W., visible 15 m. The *channel*, abreast of the light-house, is $1\frac{1}{2}$ m. wide only, with depths from 4 to 9 fathoms; this light lies 2 m. S.W. of Kedgerree Point, on the W. side of the River Hoogly.

The **Mutlah Light-vessel**, *temporary*, in lat. $21^{\circ} 6' N.$, lon. $88^{\circ} 48' E.$, in 9 fathoms, bears about E. $\frac{1}{2}$ N. in the N.E. monsoon, and E. by N. in the S.W. monsoon, from the East Channel Light-ship, distant $10\frac{1}{2}$ leagues. She shows a *fixed* light, at night, and by day hoists a *Red* flag at the main-mast. If in her position,* between March 16th and Oct. 16th, at 8 h. p.m., at midnight, and at 4 h. a.m., she fires a rocket.

Houses of Refuge, for cast-away mariners, have been established at short intervals along the sea-face of the Sunderbunds hereabouts. In each house there is a supply of biscuit and water, which will be easily found by reading the instructions put up in each, which also give other directions that will be useful. Persons cast away, reaching land to the E. of Saugor Island, should make search for a House of Refuge; and it should be borne in mind, that when a vessel is lost with a pilot on board, the fact would soon become known at the Pilot Station and in Calcutta. Parties, therefore, finding their way to the houses, should remain there, and husband the means of subsistence, in the assurance that succour will speedily reach them; or if compelled to leave, endeavour to get W. to Saugor Island, and travel along the beach until they arrive at the light-house; or make their way to a large fishing village, situated on the S.E. side of Saugor Island, using the catamaran as far as practicable.

House of Refuge (No. 1) is at Seyer Point, bearing N.E. by E. about 10 m. from the Gaspar Channel Light-vessel; it is painted *red*, and erected on a plain to the E. of some high sand-hills. House of Refuge (No. 2), painted white; is 200 yards from H. W. mark, in the midst of thick, low jungle; and E.N.E. from the first, distant 10 m.; it is situated on the most sea-ward piece of dry land, between the Subtermooky and Jumera Rivers. On the E. side of Jumera River, is a House of Refuge (No. 3), painted black, and 200 yards from H. W. mark. No. 4 is white, on the S.E. part of Dalhousie's Island, at the E. side of Mutlah River, about 5 ft. above H. W., distinguishable by a white flag close to the House, and visible above the trees. No. 5 also is white, on the S.E. part of Bangadoonee Island, about 9 m. to the E. of No. 4; a flag is hoisted as at No. 4. A catamaran and paddles, a letter of instruction, and a chart of the Soonderbuns, will be found in each house. No. 5 Refuge is about 15 leagues to N.E. of the Outer Light-ship.

THE ENTRANCE-CHANNELS, like the Banks, being subject to frequent changes, require an accurate chart or local knowledge for their navigation, and can, therefore, be only noticed in their general character. The navigable channels in the River Hoogly are, first:—**Inside Channel**, stretching from Ballasore close along the shore to Kedgerree, inside of, or to the N.W. of all the shoals, with depths in it generally from $1\frac{1}{2}$ to 3 fathoms at L. W.; this is used by the small coasting-vessels, which are navigated by natives, and draw little water.

Western Channel, (formerly called the Fairway) is bounded on the E. side by the Long Sand, and beyond its extremity, by the tail of the E. Sea Reef, and on the W. side by the Barabulla, the E. Brace, and W. Sea Reef. A buoy, called the South Channel Buoy, is placed midway between the Sea Reefs on the parallel of $21^{\circ} N.$, to mark the entrance of the channel. About 16 m. to the N. of the buoy, a narrow sand of $2\frac{1}{2}$ to 4 and 5 fathoms divides the channel midway, and similar banks as the land is approached subdivide it again into several, for the safe navigation of which a pilot is necessarily required. This channel cannot be navigated with safety at *present* by ships drawing above 14 or 15 ft. water.

Middle Channel, formed between the Long Sand to the W., and the E. Sea Reef and Gaspar Sands to the E., is narrow, with only 3 fathoms water in several places; it is therefore seldom navigated by vessels of any description.

Saugor, or Eastern Channel, formed by the E. Sea Reef on the W. side, and Saugor Sand to the E., is that at *present* in general use by ships entering or departing from the River Hoogly. There is a light-vessel, and also a buoy N.W. of her, to mark the entrance of the channel, in lat. $21^{\circ} 34' N.$, lon. $88^{\circ} 12' E.$, moored in $7\frac{1}{2}$ fathoms, showing a bright *fixed* light, from 15th March to 15th Sept., and bears from the buoy on the Pilot's Ridge N.E. by E. $\frac{1}{2}$ E. 33 m. This E. Channel or Lower Light-vessel burns a Blue light every half hour, and a maroon every quarter of an hour during the night, commencing at 7 p.m. During the N.E. monsoon, commencing in Oct. and ending in March, this light-vessel burns a maroon or torch every half hour, and a Blue light every hour: the cruising-ground where ships will have to seek pilots will be, as heretofore, in the Eastern Channel. A spire buoy, called the **Reef Buoy**, is placed near the edge of the E. Sea Reef, in lat. $21^{\circ} 9' N.$; these buoys ride greatly elevated, resembling beacons when viewed at a considerable distance, and are discerned much farther than those of the common construction. When a few miles to the N. of the Reef Buoy, the Gaspar Channel, or Upper Light-vessel, and the trees on Saugor Island, may be seen from the poop of a large ship. It is important to observe the

* The Mutlah Light-vessel is likely to be removed from the above position.

difference as to the Blue lights and maroons shown by the Eastern Channel and Pilot's Ridge Light respectively, as, if this is attended to, a vessel out in her reckoning, or uncertain of her position, cannot possibly mistake one for the other. In the S.W. monsoon this Outer Light is removed to about lat. $21^{\circ} 0' N.$

Buoys. About 9 m. N.N.W. from the Reef Buoy, and in lat. $21^{\circ} 17' N.$, there is, near the edge of the E. Reef, a *red* buoy, called the Spit Buoy, 8 or 9 m. N. by E. of which are the entrances of Thornhill and Gaspar Channels, separated from each other by a narrow sand-bank. The Upper Light-vessel is moored at the entrance of the Gaspar Channel, in $3\frac{1}{2}$ fathoms, in lat. $21^{\circ} 26' N.$ lon. $88^{\circ} 7' E.$, showing a *fixed* bright light; and it bears N. by W. 24 m. from the Eastern Channel light-vessel, when at her N.E. monsoon station.

A ship arriving at the entrance of Saugor Channel during favourable weather in the N.E. monsoon, and certain of her situation, may work up a considerable way with safety in search of a pilot. In doing this she may borrow on the edge of the E. Sea Reef in tacking from the W. side of the channel, as the water shoals regularly upon the verge of it on that side, although rather quick in some places. The depths in mid-channel, from $8\frac{1}{2}$ and 9 fathoms, between the tail of the Sea Reef and the tail of Saugor Sand, will decrease gradually as she works to the N., to about $5\frac{1}{2}$ fathoms when near the Reef Buoy. Here the depths are nearly the same from side to side, there being only about $\frac{1}{2}$ fathom more water toward Saugor Sand than there is in the W. side near the Sea Reef.

When near the Reef Buoy, or in about lat. $21^{\circ} 10' N.$, a ship ought not to stand so near the edge of Saugor Sand as to shoal her water in working farther to the N.; for it is steep-to, and dangerous to borrow upon. The best guide is to take the soundings from the edge of the Sea Reef, which may be approached to 5 fathoms in working, until 5 or 6 m. to the N. of the Reef Buoy, or until the Spit Buoy is seen; then the Upper Light-vessel will be visible, as also the trees, on Saugor Island, from the poop or mizen shrouds, if the weather is clear; and she ought to anchor until a pilot is obtained. Here she will have $4\frac{1}{2}$ or 5 fathoms at L. W. in the proper track, and it would be imprudent to venture farther up the channel without a pilot. The S. entrance of **Thornhill Channel** is about 11 m. S. of Saugor Island, and is pointed out by two buoys, bearing E. and W. of each other, 1 m. distant, the W.-most of which is painted *red* and the other *black*. The channel between these buoys leads from them N. by W. to Saugor Road, on the W. side of a black buoy, placed about 6 m. from them in the upper part of the channel. The least water in Thornhill Channel at low tide is $2\frac{1}{2}$ fathoms, but commonly 3, $3\frac{1}{2}$, and $3\frac{3}{4}$ fathoms. The water in this channel is comparatively smooth in entering it from the Eastern Channel, being sheltered by the reef; yet, in a ship of considerable draught, half-flood, or even later, is the best time to pass through it, in order to be certain of sufficient depth of water; the tide rises in Thornhill Channel on the springs about 13 ft., and when not influenced by fresh gales, it is H. W. about 8 h. 20 m.

The **Old Channel**, called also **Gaspar Channel**, is formed by the Gaspar Sand on the W. side, and by a spit projecting from Saugor Island. Near the end of this spit, on the E. side of the channel entrance, lies the **Upper Light-vessel**, previously mentioned. At $1\frac{1}{2}$ m. beyond the light-vessel, there is a buoy on the Gaspar Sand, marking there the W. limit of the channel; another buoy lies about 2 m. farther up on the opposite side, and on the W. edge of the spit or middle ground; and a third buoy on the W. side of the N. entrance of the channel, about $1\frac{1}{2}$ m. farther. From this last-named buoy, the anchoring buoy in Saugor Road bears about N.W. by N., distant $3\frac{1}{2}$ m. As the tides in S.W. gales generally set strong to the E., attention to the buoys is requisite to observe the way a ship is driving, and the weather side of the channels should be kept on board, remembering that the tide does not set fair through those channels, for the ebb runs to the S.W. over the reefs, and the flood to the N.E.

Lacam Channel appears now to be closed to strangers, and the common passage into both the Subtermooky and Jumera Rivers is to the E. of Subtermooky Sand.

Channel Creek, called by the natives Barratulla, is a small branch of Hoogly River, dividing Clive Island and Saugor Island, and then taking a direction on the E. side of Saugor Sand to seaward about S.S.E. $\frac{1}{2}$ E., passing Seyer Point, which bears N.E. by E., and is about 10 m. from Gaspar Channel Light-vessel. House of Refuge, No. 1, painted *red*, is erected on Seyer Point, on a plain, and to the E. of some high sand-hills that here line the shore.

The River. As pilots are indispensable to a vessel going up to Calcutta, it is needless to describe all the windings of the river. Under no circumstances are vessels permitted to be under weigh at night between Saugor Roads and Mud Point, which is the N.W. point of Saugor Island. At Diamond Harbour, 43 m. above Saugor Light-house, moorings are laid down for vessels arriving in distress from loss of anchors and cables; many vessels on arrival or departure are found lying here. The James and Mary Sand, just above the Hoogly Semaphore, is the most dangerous shoal.

in the River. Above that the navigation has been improved by lights, so that steamers may pass up or down by night. Pilots may bring in steamers, at a draught of 22 ft., but sailing-vessels with only 20 ft.; for vessels drawing more than this, the Master Attendant of Calcutta can give special permission, at certain times of tide, to bring them above Cowcolly Light-house. The Port Rules will be found elsewhere. (*See Index*).

CALCUTTA is on the E. or left bank of the Hoogly; the flag-staff of Fort William being in lat. $22^{\circ} 33\frac{1}{2}'$ N., lon. $88^{\circ} 19' 40''$ E. The station of the East Indian Railway, leading to Delhi and to Bombay, is at Howrah, opposite Calcutta; but that of the Eastern Bengal Railway, leading to Dacca, is on the Calcutta side. Here is also the terminus of the line that runs to Port Canning on the Mutlah River, but that port appears to be little used.

Chandernagore, a French settlement, in lat. $22^{\circ} 52'$ N., lon. $88^{\circ} 25'$ E., is on the *right*, or W. bank of the Hoogly, about 20 m. above Calcutta. This place, like all the small settlements of the French scattered about British India, is subject to Pondicherry. Chandernagore can be reached by rail from Howrah in little more than one hour. A century ago it possessed great opulence, and the largest ships could lie close to the town.

APPROACHING CALCUTTA SAND-HEADS FROM THE E. Ships bound to the Hoogly River during the N.E. monsoon, were formerly directed to keep close along the coast of Aracan to lat. 21° N., or in sight of the White Cliffs, and from thence to steer W., or W. by N., between lat. 21° N. and $21^{\circ} 20'$ N. This circuitous route was chosen that ships might be enabled to anchor in moderate depths when calms and faint airs prevailed, and to prevent currents occasioned by the freshes out of the rivers drifting them to the S. out of soundings. These S. currents are, however, seldom experienced except in the vicinity of the land, where also faint airs and calms prevail more than farther out in the open sea; on which account it seems advisable to keep at a moderate distance from the Aracan coast, and the N.E. angle of the bay, in proceeding to the River Hoogly in the N.E. monsoon. Whether a ship has departed from the vicinity of the Andaman Islands or from Cape Negrais, she ought to endeavour to make as much *Nothing* as the winds will permit, taking care not to get too far to the W.; this will be avoided by tacking to the E. at times, when the wind veers more to N. than usual. In an indifferently-sailing ship, or when the longitude is not correctly ascertained, it may be prudent to endeavour to get into soundings about 14 or 15 leagues to the E. of the Mutlah Light-vessel, then cross over the Swatch, or chasm in the bank of soundings, which will point out the true situation.

The Swatch of No-ground extends nearly N.N.E. from lat. 21° to $21^{\circ} 22'$ N., and is about 3 leagues broad; but its shape and dimensions are not *exactly* determined; there are no soundings to be got in it, with from 150 to 50 or 60 fathoms of line. Its N. extremity is distant from the land only about 6 leagues, with depths between them from 13 fathoms near the former, decreasing to 3 fathoms towards the land. Round the other parts of it, the depths are generally from 40 to 20 fathoms. The W. edge of the Swatch, in lat. $21^{\circ} 12'$ N., is *about* 25 m. to the E. of the Mutlah Light-vessel. (*See page 477*).

Ships getting into soundings far to the E. ought to borrow towards the land to 17 or 20 fathoms, that they may be enabled to anchor in moderate depths when requisite, or benefit by the tides when favourable for proceeding to the W. For in deep water calms are frequent, with a drain of E. current in the N.E. angle of the bay, and the influence of the ebbs setting to the S. reaches farther out than that of the flood-tides. It is advisable for all ships bound to the Hoogly River from the commencement of the N.E. monsoon to its failure in the early part of March, to endeavour not to get to the W. of the Eastern Sea Reef; but rather to obtain soundings on this reef, or on the tail of Saugor Sand, that their true situation may be known. A ship coming directly from the S. upon the tail of a sea reef cannot be certain on which of them she has struck soundings, although her longitude may be known tolerably well. She ought, in this case, to keep a good look-out for ships coming out of the river, and if several are seen, or a single large one be standing out to sea, her situation may be known: for in all *probability* those ships are proceeding out by the Eastern Channel.

To approach the Eastern Channel from sea-ward, the most advisable method is to get soundings on the tail of the Subtermooky Sand or Saugor Sand. To effect this, a ship should endeavour to get into lat. $21^{\circ} 4'$ or $21^{\circ} 5'$ N., whilst to the E. of Saugor Sand, and steer W., keeping in $8\frac{1}{2}$ fathoms at L. W., or about $9\frac{1}{2}$ or 10 fathoms at H. W. If the Mutlah Light-vessel is in position, that will be her guide. She will have soft ground in this parallel until the depths decrease suddenly on the tail of Saugor Sand, over a hard bottom. If near L. W., she may edge to the S. a little, and after crossing its S. extremity in 5 to 7 fathoms, haul to the N.W. into the proper channel. If more than half-flood, she may cross over Saugor Sand when the latitude does not exceed $21^{\circ} 7'$ N.; but this sand or reef being steep on both sides, ought always to be approached with caution particularly to the N. of the latitude last mentioned. If in steering to the W., a ship keep *exactly*

in lat. $21^{\circ} 0' N.$, she will miss the tail of Saugor Sand, but may sight the Outer or E. Channel Light-vessel. It seems, however, preferable to keep so far up as to get the first hard soundings on the Subtermooky or the Saugor Sands, when the weather is favourable and the sea smooth, to prevent mistakes; for many ships have thought the soundings they had to be those of the E. Sea Reef, when they came upon it from the S. When soundings have been obtained on the tail of Saugor Sand, and a ship's true place is ascertained, by sighting the Outer Light off the Eastern Channel, she may, if no pilot-vessel is discerned, work up in search of one to the Reef Buoy.

THE SUNDERBUNDS, OR DELTA OF THE GANGES.

The Coast of Bengal, from Hoogly River to the principal mouth of the Ganges, is all very low, without any distinguishing marks; and the country is a level, woody plain, generally called the Sunderbunds, or Soonderbuns. The low country, or *Delta of the Ganges*, is intersected in various directions by numerous small branches of that great river and other rivers, which communicate by lateral branches, and most of them are discharged by wide channels into the sea.

Roymutlah, or Mutlah River, about 30 m. to the E. of Saugor, separated from Jumera River by Bulcherry Island and flats, is above a league wide at the entrance, the channel leading in a N. direction. The depths at the entrance are 9 or 10 fathoms; and the S. extremity of the land that bounds it on the E. side is in lat. $21^{\circ} 32' N.$, having a very shoal bank extending from it to sea-ward about 7 leagues. Bulcherry Island, on the W. side of the entrance, is large, separated from the other land only by a narrow creek.

Port Canning on the Mutlah. This port, in lat. $22^{\circ} 20' N.$, lon. $88^{\circ} 39' E.$, hastily adopted because its river is easier of navigation, and deeper than the Hoogly, was very little frequented by shipping from the first; although only 55 m. from the sea, and having a railway to Calcutta. It is *said* now that the Government has withdrawn its countenance from this place, and it is no longer one of the chief ports. But, as it may be adopted still by some vessels, we retain the following directions for its navigation.

DIRECTIONS FOR THE RIVER MUTLAH. The W., or Ward's Channel, is bounded on the W. by the Bulcherry Reef, or Sand, extending S. from the island of that name; and on the E. by the Roymutlah Sand, part of which dries at L. W. This channel is from 2 to 5 m. wide, and is marked off by the **Mutlah Floating Light** (*temporary*) off its entrance, in 9 fathoms, in lat. $21^{\circ} 6' N.$, lon. $88^{\circ} 48' E.$, and by six buoys, four *Red*, on the W. side, and two *Black*, on the E. side.

Buoys on W. side. The outermost, or **Reef Buoy**, is a first-class spire buoy, with two baskets on it; it is painted *Red*, and marked with the letter M; it lies in $4\frac{1}{2}$ fathoms, L. W., spring tides; lat. $21^{\circ} 10' N.$, lon. $88^{\circ} 43' E.$, or 5 m. to N.W. of the Mutlah Floating Light; and bears from the Eastern Channel Floating Light Buoy, E. by N. $\frac{1}{4}$ N., distant 32 m. The **centre Bulcherry Buoy** is a second-class spire buoy, with one basket on it; it is painted *Red*, and marked **MUTLAH** in full; it lies in 4 fathoms, L. W., about 7 m. N.N.W. from the outer, or Reef Buoy. The **Bulcherry Spit Buoy** is also a spire buoy, painted *Red*; it lies in 4 fathoms, L. W., on a spit of the sand, about 9 m. N. $\frac{1}{4}$ W. of the centre buoy. The **upper Bulcherry Buoy** is also a spire buoy, painted *Red*; it lies in $3\frac{1}{2}$ fathoms, about 6 m. N. by W. from the Spit Buoy, and W. by S. $\frac{1}{4}$ S. of the flag-staff or beacon (60 ft. high) on Dalhousie Point. This beacon is 28 m. to N. by W. of the Mutlah Light-vessel.

Buoys on E. side. The **outer E. buoy** of this channel is a second-class spire buoy, painted *Black*, with one basket on it; it lies in $4\frac{1}{2}$ fathoms, L. W., on the S.W. verge of the Roymutlah Sand, N.E. by N. of the Reef Buoy, distant about $5\frac{1}{2}$ m. In Jan., 1857, a floating light-vessel was placed about 6 m. or 7 m. to the S. of this black buoy, in 9 fathoms, in lat. $21^{\circ} 6' N.$, lon. $88^{\circ} 48' E.$, exhibiting a *fixed* light, visible 7 m. The Roymutlah W. Spit Buoy is a second-class spire buoy, painted *Black*; it lies in 4 fathoms, L. W., N.W. $\frac{1}{4}$ N. from the outer black buoy, distant about 10 m., and N. about 6 m. from the centre Bulcherry Buoy. The mid-channel course from sea to abreast of the above Spit Buoy is N.N.W. $\frac{1}{4}$ W. 15 m. From that point a N. course of 15 m. will carry a vessel up to Halliday's Island; the beacon on which bears about N.W. between 5 and 6 m. from Dalhousie Island Beacon.

The E., or Roymutlah Channel, is bounded by the Roymutlah Sand to the W., and the Bangadoony Sand, or Reef, to the E., and is marked off with four buoys, three *Red*, or W., one *black*, or E. The **outermost buoy** is a second-class spire buoy, with one basket upon it; it is painted *red*, marked **MUTLAH**; it lies in 5 fathoms (L. W. depth), on the S.E. verge of the Roymutlah Sand, and bearing N.E. by E., about 10 m. from the Bulcherry Reef Buoy. The **Roymutlah E. Spit Buoy** is painted *red*; it lies in 5 fathoms, at L. W., bearing N.N.W. $\frac{1}{4}$ W., about 6 m. from

the outer buoy. The upper Roymutlah Buoy is painted *Red*; it lies in $4\frac{1}{2}$ fathoms, at L. W., and to N.W. of the Spit Buoy, distant about $5\frac{1}{2}$ m.

The innermost buoy of this channel is painted *Black*; it lies in 5 fathoms, (L. W. depth), on the S. verge of a flat extending from Dalhousie Point to the S.S.E.; it bears from the upper Roymutlah Buoy N. by W., distant about 4 m. The mid-channel course in the Roymutlah Channel is N.W. $\frac{1}{4}$ N. to the *Black* buoy, and from that point N.N.W. to N. by W. to Halliday's Island. The bottom throughout the channels is mud, the sands exceedingly hard, and the lead an excellent and safe guide towards them. The least water in the W., or Ward's Channel, is 4 fathoms; and in the Roymutlah 5 fathoms at L. W. springs.

From Halliday's Island the course continues N. up to the "Cattalee," where the river takes a sharp turn to the W. and the channel contracts. Up to this point a stranger, with Ward's Chart, and ordinary care, could, without a pilot, conduct his ship with safety, attending to the set of the tides, leaving the *Red* buoys to the W., and *Black* buoys to the E. of his course.

Vessels resorting to the River Mutlah during the S.W. monsoon should adopt a similar route, and conform to the directions for making the Pilot Station at the entrance to the River Hoogly; thence taking a departure from Eastern Channel Floating Light, steering E. by N. $\frac{1}{4}$ N. to cross the tail of the E. prong of Saugor Sand in 5 fathoms, off which they would deepen into 7 fathoms, shoaling again on the Subtermooky or old Light-house Sand to $5\frac{1}{2}$ or 6 fathoms, deepening off into $6\frac{1}{2}$ or 7, and crossing the Bulcherry Reef in $4\frac{1}{2}$ to 5 fathoms a little S. of the Reef Buoy. The temporary Mutlah Light-vessel is placed about 5 m. to the S E. of the Reef Buoy.

Commanders of vessels doubtful about crossing the tails of sands in a heavy swell could steer more to the S., and keep in 8 or 9 fathoms, soft ground; but great care would be requisite not to overrun the distance.

During the N.E. monsoon, commanders of vessels, confident of the correctness of their reckoning, should work up direct for the Bulcherry Reef Buoy; but during cloudy or thick weather, crossing the Swatch of No-ground in about the latitude of the buoy, and running down upon it, would be advisable. If the Mutlah Light-vessel be continued in its place, she will of course be the best guide.

Tide. It is H. W., on F. and C., about 9 h. 15 m. At the Bulcherry Reef Buoy the tides set round, as in the channels to the Hoogly; the floods making to the W., the ebbs to the E., having a velocity during the springs from $2\frac{1}{2}$ to 3 m. per hour, and a rise of 9 ft.

Bangadoony River, the next to the E. of the Mutlah, and 5 m. from it, is small, with tolerably deep water at its mouth, and the course of the channel to sea-ward is about S.E. The entrance lies about 15 m. to N.E. of the Mutlah Light-vessel. It takes its name from an island which separates this entrance from Gua-Suby River, the next in succession to the E. A vessel of considerable burden might pass to the N. of Bangadoony Island, and moor between it and a small island in the passage, sheltered from all winds. **Gua-Suby River** is of considerable size, but the most difficult to enter of any on the coast, on account of the bending channel at its mouth. A vessel, without a pilot, should not attempt to enter it. **Roymongul Entrance**, about 5 leagues to the E. of Gua-Suby River, receives, about 2 leagues from the sea, the united streams of three rivers,—Harribanga the W.-most, Roymongul the next, and Jubunah the E.-most. The point of land on the E. side the entrance is in lat. $21^{\circ} 38' N.$, and lon. $89^{\circ} 12' E.$, with 5 and 6 fathoms in the channel close to it, and 10 or 12 fathoms inside towards Harribanga River. From the point sea-ward, in a S. by E. direction, the depths decrease gradually to 4 fathoms in this channel, and the outer part of it has a distinct bar, with 3 and $3\frac{1}{2}$ fathoms at L. W., which lies about 17 m. to S. $\frac{1}{2}$ E. from the point. This is one of the most considerable openings on the coast, and forms a good harbour.

Mollinchev River, about $2\frac{1}{2}$ leagues from Roymongul entrance, has a channel stretching in a S.S.W. direction to sea-ward, with 6 or 7 fathoms near the land, decreasing to 3 and 4 fathoms. A few miles farther to the E. is **Burrapungah River**, having its channel separated from the former by Putnay Island. From this island an extensive reef and flat stretches out $3\frac{1}{2}$ or 4 leagues, on which the ship *Falmouth* was lost. H. W., on F. and C., 10 h.; rise and fall about 8 ft. Directly S. from Roymongul and Mollinchev Rivers, at the distance of 9 leagues, the **Swatch of No-ground** is situated (described at page 479). **Murjattah River**, situated $2\frac{1}{2}$ or 3 leagues to the E. of Putnay Island, is wide at the entrance, the channel stretching from the land on the E. side nearly S. by W., shoaling gradually from the land to 3 or $3\frac{1}{2}$ fathoms outside. About 4 or 5 m. inside the entrance of the river, two islands, called the Pavangah Islands, are situated, and on the S. one there is said to be a tank of fresh water. **Bangarah River**, about $3\frac{1}{2}$ leagues E.N.E. from the former, and much smaller, has a channel stretching S.E. from the point of land on the W. side, with depths from 3 and 4 fathoms, decreasing outside to $2\frac{1}{2}$ or 3 fathoms. About half-way between this

river and that of Murjattah, another small river falls into the sea, and is only a branch of the former, which all communicate with each other. The **Argo Flat** is an extensive bank of shoal soundings off the Bangarah, and extending to the Hooringottah River.

HOORINGOTTAH RIVER, situated $4\frac{1}{2}$ leagues to the N.E. of Bangarah River, and 33 leagues to the E. of Saugor Island, has a very spacious entrance, about 3 leagues wide, between the two great banks or shoals which form it. These project from the land on each side of the river several leagues to sea-ward, or to lat. $21^{\circ} 30' N.$, having 8 or $3\frac{1}{2}$ fathoms hard ground in this latitude on their extremities, and shoaling gradually to 2 and $1\frac{1}{2}$ fathoms farther in towards the land. The W.-most of these, called Argo Flat, has $3\frac{1}{2}$ fathoms on its extremity, in lat. $21^{\circ} 31' N.$, lon. $89^{\circ} 50' E.$, and the W., or **Great Channel**, leading into the river is on the E. side of this flat, in a S. by E. line from Tiger Point, which point forms the W. side of the river's entrance. Deer Point, on the E. side of the river, bears due N., and is 10 m. from Tiger Point; but the outermost land, that marks the E. side of Hooringottah River entrance, is called Landfall Point, the S.W. extreme of which bears about E.S.E., distant 12 m. from Tiger Point. The depths in the entrance of the channel, in lat. $21^{\circ} 31'$ to $21^{\circ} 33' N.$, and between lon. $88^{\circ} 53'$, and $88^{\circ} 56' E.$, are nearly the same as on the tails of the sands, from 3 to $3\frac{1}{2}$ fathoms at L. W., and in some places rather hard bottom. These depths continue with little variation till within 5 or 6 m. of Tiger Point, when they increase to $4\frac{1}{2}$ and $5\frac{1}{2}$ fathoms abreast of it. About 5 or 6 m. inside the tails of the reefs lies the S. end of an extensive sand, called *Heroine* Reef, which lies off the Bishkhali River, and to the S.W. of Landfall Point. When within 7 m. of Tiger Point, there commences a Middle Ground, by which a Middle Channel is formed between it and the *Heroine* Reef, with from 3 to $3\frac{1}{2}$ fathoms, water; but it is narrow, the Great Channel on the W. side of the Middle Ground being the only safe passage for large ships.

Directions. As the land at the entrance of Hooringottah River will not be discerned till a ship has entered into the channel a considerable way between the sands, the Swatch of No-ground will be a tolerable guide to direct her to the entrance of that river, observing, that from the N.E. angle of the Swatch, the S. extreme or tail of Argo Flat bears N.E. by E. about 12 m. When this flat is approached, and a ship certain of her position, she ought to steer about N. by E. or N. along its E. side, or in working up with the flood-tide (in the N.E. monsoon), she may make short tacks from it to the E., till Tiger Point is seen, then keep it bearing N. by W., which will lead her up in mid-channel, being guided by the lead. It must be observed, that **Landfall Point**, on the E. side the river, being 6 m. farther S. than Tiger Point, will be seen before it, and probably also the land on the W. shore, which stretches about S.W. by W. from Tiger Point, and the island that forms the S. side of the Bangarah River; but Tiger Point forms the W. side of the Hooringottah River, by which it will be easily known. A ship may pass this point within $\frac{1}{2}$ m., also Buffalo Point, about $1\frac{1}{2}$ m. N. by W. from it, she may pass at the same distance. At the entrance of Hooringottah River it is H. W. about 11 h. on F. and C. of moon, and the tide runs very strong on the springs.

Morrellgunj, in lat. $22^{\circ} 28' N.$, lon. $89^{\circ} 53' E.$, a new port on the W. bank of Hooringottah River, was declared, in 1868, to be a port for shipping and landing of goods, during the N.E. monsoon only, and to be for a time a *free* port. The experiment has given promise of success. The rivers which disembogue into the Hooringottah, pass through a part of the country abounding in rice, which is here purchased on very moderate terms; ships, therefore, have sometimes proceeded to this place, and loaded with grain for the Coromandel coast, when the prices were high at Calcutta. The *Cartier* and other ships, which loaded in Hooringottah River, were from 400 to 500 tons burden, but larger vessels can now enter, as the channel has been marked with *buoys*. A ship being about to enter it, or any of the rivers along this coast, ought to keep a boat sounding, to trace out before her the soft bottom in the proper channels, as they are imperfectly known, little frequented, and liable to alter, by the freshes running out against strong winds and heavy sea during the S.W. monsoon.

The Hooringottah River has lately been surveyed; but others adjoining it, both to the E. and to the W., have not been examined for more than thirty years, and the banks off their mouths must have undergone immense changes.

Aspect of Coast. Every navigator proceeding to this coast, or driven towards it by accident, ought to remember, that the whole of it, when first seen from a ship's mast-head at sea, has the appearance of a range of low islands covered with trees, and that the ground between the ship and them is a sloping bank, with very little water on it near the land. That the bank is cut through by a channel between each island. That these channels all have a *soft* bottom, with an increasing depth of water towards the land. When the coast can be seen from the deck, the depth of water is in general about 3 fathoms at L. W., and very few places have much more or less, the bottom at

this distance is mostly stiff ground. If a ship be in a channel, as she draws nearer the land, the ground will become *very soft*, with an increase of depth: if not in one, the ground will suddenly become *very hard*, and the depth decrease; and should this be the case, she ought immediately to haul to the E. or W., as the wind may permit, until the ground become *soft*, and there is no doubt that the depth will increase at the same time. Whenever the ground is found to be quite soft, a ship may steer for the opening without fear; as she enters it, what appeared to be an opening between islands, will be found in reality the entrance of a river. The coast not being inhabited, it is from the salt-works interspersed along it in some places that those who have the misfortune to be driven upon this coast in tempestuous weather may expect relief, either of boats or of men, to pilot them to the inhabited country. The people employed on this business have the general name of Mollingaho, and are a quiet, harmless race of men. A small supply of fresh water and a little rice may be got from them, which, with the few fowls they have, is their principal food. The crowing of jungle-cocks in the woods is often heard, which should be no inducement for strangers to go into the woods in search of people; they ought also to beware of going ashore at the Salt Churrs in the night, for both the royal tiger and the leopard are on the watch there, and often cover all the ground over at night, as may be seen by marks of their feet.

Rabnadab Island, the S. extremity, is in lat. $21^{\circ} 50' N.$, and 6 or 7 leagues to the E. of Hooringottah entrance. This Island is large, with a channel on each side; the W.-most, extending from the W. side of the Island about S.S.W., is narrow, but thought to have 3 or $3\frac{1}{2}$ fathoms, water. The other, on the E. side, is supposed to contain nearly the same depths, but shoal water extends 9 leagues sea-ward. To the N.E. and E. of Rabnadab is a group of islands, called **Don-Manic Islands**, past which the great River Ganges debouches into the sea, and bringing down alluvial soil and sand, has formed several **sandy islets**, both to the S. and the W. of these islands.

The Ganges Sea Reefs. These spits or shoals lie nearly parallel to each other in a general S. by W. direction, extending sea-ward fully 30 m. to the S. of Rabnadab Island, and forming dangers to vessels trading to the Hooringottah, which forbid intercourse with that river during the S.W. monsoon. The **outermost banks** lie about 40 m. to E. of the head of the Swatch, and between the meridians of lon. $90^{\circ} 5'$ and $90^{\circ} 45' E.$; they extended to the S. into lat. $21^{\circ} 15' N.$, and doubtless they encroach farther every year. Vessels, therefore, should never shoal under 10 fathoms by day, or 20 fathoms by night off these banks; but, to the E. of lon. $91^{\circ} E.$, a vessel bound to Chittagong must use these **leading banks**, and feel her way round them in 7 fathoms, water. (See Chittagong).

The GANGES and MEGNA RIVERS, with the various islands and sand-banks forming their channels of approach, are between Rabnadab Island and the coast of Chittagong. The sea-face of the islands is near the parallel of $22^{\circ} 18' N.$, and the extremes of the sand-banks which project to the S. take a general N.E. direction from lat. $21^{\circ} 15' N.$, lon. $90^{\circ} 25' E.$, towards the town of Chittagong, 38 leagues. The large island of **Dukhin Shabazpoor** separates the mouth of the great River Megna from that of the Ganges; but to the N. of it these rivers communicate, and form several smaller islands. Betwixt Dukhin Shabazpoor and **Hattia**, the next island to the E., there are other smaller islands, the S.-most of which fronting the sea, called Manboursa, is the largest. To the E. of Hattia are the islands of Sidi-Budu and Sun-Deep, near the main land: these are large, particularly the latter, which is the outermost. The River Megna joins the sea by the various channels formed between these islands. In Sept. this river overflowed its banks, inundated the adjacent islands, Hattia, Dukhin Shabazpoor, &c., whereby many of the cattle and inhabitants perished.

Sun-deep extends from lat. $22^{\circ} 22' N.$, lon. $91^{\circ} 31' E.$, 5 leagues to the N.; it is a fertile island, abounding with cattle, but free from tigers and other wild beasts which infest the neighbouring continent. From the S. end of the island a shoal projects about 4 leagues to sea-ward, having a channel with $3\frac{1}{2}$, 4, and 5 fathoms, water, along its W. edge, leading to the principal town on the W. side of the island, situated about a mile from the shore, known by a remarkable tree near it, and a grove of palm-trees. There are ferries to the neighbouring islands and the main land; but the sea-face of the banks is too little known for any sea-going ship to approach without a native pilot.

The Bank of Soundings extends for fully 70 m. to the S. of the Islands Sun-deep and Hattia. On the outer 30 m. of this bank, the depths range from 5 to 7 fathoms; so (for distinction) we call it the **Great Megna Flat**, which if properly surveyed would prove an invaluable guide, "a *leading bank*" (as it has been called) for vessels bound to Chittagong, to enable them to pass up clear of those dangerous shoals, the N. and S. patches, or **Kootubdeah Banks**, which stand out in the fairway, and several miles to the W. of Mascal and Kootubdeah Islands. The S. patches are 25 m. on a S.S.W. bearing from the Kootubdeah Light-house, but at that distance the light cannot

be seen (except from mast-head, in exceptional clear weather), and therefore the lead must be the mariner's guide, as he works up (with the N.E. monsoon) to the N., towards Chittagong, along the edge of the Great Megna Flat, between 6 fathoms to the W. and 9 fathoms to the E. The greatest depths of water hereabout are guts with 10 and 11 fathoms, running in a N. and S. direction, on either side of the S. Patches. When the Kootubdeah Light is in sight, it may be steered for when bearing between N.E. by N. and N.E.; but remember the *Dolphin Shoal*, which lies 4 m. to the W. of the light-house.

COAST OF CHITTAGONG.

Approaching Chittagong. The usual track from the Hoogly Eastern Channel to Chittagong, was to cross the Patch Sand, and sight the White Cliffs about Cox's Bazar, keeping to the W. of Red Crab Island, and working up betwixt the two outer sands; which track seems proper in some periods of the S.W. monsoon, when cloudy weather often prevents observations from being obtained. But in the fine weather months of either monsoon, the shortest and best passage (having more room for working if requisite) will be found to the W. of the Patch Sand; and the best guidance thereto is, by steering E. by N. from the Hoogly Outer Light-vessel, until you shoal on the flats off the Ganges mouths in about 7 fathoms, between the meridians of Landfall Point and Don-Manic Islands (See Hooringottah, page 482). These banks have been called the *leading sand* to Chittagong; and a vessel may make the circuit of them by keeping in 7 fathoms, hauling out to S.E., or up to N., to maintain that depth. Being about lat. $21^{\circ} 12' N.$, and due S of the Don-Manic Islands, the course will be about E., till the meridian of Sun-deep Island is approached; then a nearly N. course for about 20 m. along the E. verge of the Great Megna Flat, hauling gradually to N.E., to keep in a line of 7 fathoms (L. W. depth), till you sight Kootubdeah Light. If you keep too long steering due E., you will deepen gradually into 10 or 12 fathoms off the W. edge of the Patch Sand; therefore it is advisable for all ships bound to Chittagong to haul to the N. and N.W. after getting one cast of 10 or 11 fathoms. The worst part of the Patch Sand is its N. end, which is easily discernible during daylight in blowing weather by the agitated water upon it. At the distance of $\frac{1}{2}$ m. to the N. of it, you may cross to the E., carrying 8 and 9 fathoms, water; and thus situated, any vessel may steer towards Chittagong River on a N. course with safety. There is a pilot constantly in attendance, to carry ships into the river, and there are *buoys* placed on the sands to point out the channel. In the S.W. monsoon, the bar of the river looks frightful, as the sea breaks over it in most places, and the E. side of the entrance is bounded by sands, which dry at half-ebb, or at L. W. The best time to enter the river is at H. W., *slack*; as the flood sweeps rapidly across the entrance, it is dangerous to attempt going in while it is making.

CHITTAGONG, or KORNAFULI RIVER (properly Chatigaon, and called Xatigam by early Portuguese navigators) has its entrance in lat. $22^{\circ} 12' N.$, lon. $91^{\circ} 48' E.$, is formed on the N.W. side by Petunga Point and a contiguous sandy islet fronting the sea; and on the E. side by Norman Point, which is low, and projects very little from the coast-line, but now is marked by a barrel-shaped beacon on a tripod, 65 ft. high, where two vertical lights are shown at night. The breadth of the entrance between these points is about $1\frac{1}{2}$ m., but the channel is now buoyed. Pilots are to be had to take a vessel in. From the sandy islet that fronts Petunga Point, a sand projects about $\frac{1}{2}$ m. to the S.W., and bounds the entrance of the channel and the bar on the W. side, the latter having 9 ft. at L. W. spring-tides. Two *white* buoys in 12 ft. mark the N. side of the bar, and two *black* buoys in $10\frac{1}{2}$ ft. mark the S. side. H. W. on F. and C. at 1 h.; rise, 13 to 15 ft. in Oct., and 10 ft. on neaps. Outside the bar, the flood sets about N.N.W., and the ebb to the S.S.E., with a velocity of 3 to 4 m. an hour, usually, on the springs. At 2 m. below the town, the river is much altered, requiring a pilot; but from thence to the entrance, the new chart is a fair guide.

Lights. On the tripod at Norman Point, in lat. $22^{\circ} 11' N.$, lon. $91^{\circ} 49' E.$, two *fixed* lights (8 ft. apart) are hoisted vertically; the upper one is 38 ft. above H. W. mark. They are visible 6 m., and should be approached on a bearing between N.N.E. and N.E. by E.; and a vessel should anchor in 5 fathoms (L. W. depth), about 2 m. off the lights, on the latter bearing.

Chittagong, or Islamabad, the principal town on the coast, in lat. $22^{\circ} 20' N.$, lon. $91^{\circ} 51' E.$, is about $2\frac{1}{2}$ leagues from the entrance of the river; it is a place of much trade, under the Bengal Government, there being a marine yard, where ships of considerable burden are constructed, and good sail-cloth manufactured. Grain is procured at a very reasonable rate, the adjacent country abounding in rice.

Should a vessel be driven to the N. of Chittagong River during Southerly winds, she should (if flood-tide) anchor as soon as possible, or keep under weigh until the ebb makes, when she may

work back to her port. The vast quantity of soil carried down the great rivers has filled up the channel between Sun-deep and the Chittagong coast, so that the depths, which were formerly 4 and 5 fathoms, are not more than 2 or 3 fathoms at the present time.

Sungoo River has its mouth abreast of Angor-koli, and nearly 3 leagues to the S. of Norman Point; the Fakir's Tree being about mid-way, or nearer to Chittagong. Poang-Haut is a market town about 80 m. up the Sungoo River. At 7 m. S. of Angor-koli, stands **Cuckold's Point**, in lat. $21^{\circ} 57' N.$, being 5 m. to N.N.E. of Kootubdeah Light-house. A shoal-bank fringes this shore and seems completely to close for navigation the N. entrance of the Uckoia Channel, passing round Kootubdeah Island. The **Dolphin Shoal** (least water 4 ft.) lies to S.W. by W. of Cuckold's Point, and 4 m. to the W. of the light-house. The passage between this shoal and Kootubdeah is 2 m. broad, and has 6 or 7 fathoms.

Kootubdeah Light-house, in lat. $21^{\circ} 53' N.$, lon. $91^{\circ} 53' E.$, is built on the N.W. side of the island, and about a league from its N. point. It is 100 ft. high, and shows a *fixed* light, 120 ft. above the sea (H. W. level), and visible 17 m. off. This light may be approached by a large ship when bearing between N.E. by N. and N.E. $\frac{1}{2}$ E., which course will lead her between the N. patches and a shoal which lies more than 3 m. to S.W. by S. of Dolphin Shoal. When the Light-house is about 1 league off, she may haul gradually to the N., and after passing it, keep it bearing S. by E. till the two lights on Norman Point are seen ahead.

Kootubdeah Island is low and woody, 4 leagues in length, nearly N. by E. and S. by W. On the S. end there is fresh water close to a tope of trees, and several creeks are formed on the E. side. The S. part of this Island has extensive sands projecting to the S.S.W. for 4 m.; and others run off the W. side in a S.S.W. direction from the light-house for 10 m. Outside of these are the shoals called the N. patches, which lie 3 leagues to the S. of Dolphin Shoal.

To avoid the N. and S. Patches. A ship being in 15 to 20 fathoms, abreast of Elephant Point (in lat. $21^{\circ} 10' N.$), and bound to Chittagong, with the wind fair, a N.W. course will carry her outside of the shoals, if there be no oblique tide in passing them, with an offing of not less than 5 leagues from Mascal Islands. On this N.W. course, the soundings may shoal to 7 or 8 fathoms, on the tail of the S. Patches, but afterwards deepen to 10 or 11 fathoms. Thence they will shoal gradually towards 7 fathoms on the Great Megna Flat, along the E. edge of which the vessel may stand to N. and to N.E. to sight the Kootubdeah Light. When Kootubdeah Light bears N.E. by N., you may steer for it (being then to the W. of all the N. patches), approaching the Light within 2 m.: and when it bears S. by E., steer away from it on a N. by W. course, which will take you up to Chittagong Roads, passing between Dolphin Shoal and the coast.

The distance from Kootubdeah to the river's mouth is 6 leagues, and the course N. by W.; the coast between them is low and flat near the sea, but hilly 2 leagues inland. The chain of hills between Kootubdeah and the river, situated about 18 m. inland, ends in a point about 3 m. S. of the parallel of the river's mouth. The Fakir's Tree is thick and bushy, situated 3 m. to the S. of Norman Point, and 4 m. N. of Angor-koli, and, being close to the shore, may be discerned, although the weather be hazy. In clear weather, the hill called Shakhbroaj, with two round trees and a flag-staff, may be seen when abreast of the Fakir's Tree, distant 10 or 11 m. This hill terminates to the S. a chain of low hills extending parallel to the coast, in which Seetacoon Hill, opposite to the Island Sun-deep, is the highest and most remarkable, having on it a small pagoda. The bottom, between Kootubdeah and Chittagong River, is stiff and good for anchorage; a ship bound into the river, wanting a pilot, should anchor abreast of the Fakir's Tree in $4\frac{1}{2}$ fathoms, about 2 m. from the shore, from whence the beacon on Norman Point will be to the right of the flag-staff, bearing about N.N.E. In strong gales the sea here runs very short, and often breaks over a small vessel. It would be dangerous to enter the river without a pilot.

MASCAL ISLANDS. Mascal Island is about 15 m. in length from N. to S., and 6 m. in extreme breadth; it has some small elevations, and being the largest, the group is generally known by the name of the Mascal Islands. **Matrabari Island** lies on the N.W. side of Mascal Island, being only separated from it by a narrow channel, but having a deep channel between it and Kootubdeah. The chief town of Mascal Island is at its S.E. end, and accessible by the Mascal Channel to the E. of Red Crab Islet. **Badgong**, in lat. $21^{\circ} 38' N.$, a place of salt manufacture, is situated up a creek behind Mascal Island. **Ramoo Town**, in lat. $21^{\circ} 30' N.$, is some distance up the Bagkhali River, at the mouth of which is Cox's Bazaar.

The Channel inside of Kootubdeah, which separates it from Matrabari Island and from the main, called Uckoia by the natives, has soundings in it from 4 to 5 and 6 fathoms. The N. entrance of this channel, formed between the N. end of Kootubdeah and Cuckold Point, is contracted by banks on each side, and a shoal-bank outside closes this entrance to all but small coasters.

Kootubdeah Channel. If hazy weather prevent the White Cliffs from being discerned until

a ship approach near them, when the wind is too far Westerly for her to clear the shoals, a place of shelter for small vessels may be found within the N. Patches, but a more sheltered one in Kootubdeah Channel. To gain this latter place, pass Red Crab Island, bearing E. $2\frac{1}{2}$ or 3 m., and from this station steer about N. by W. in 10 to 15 fathoms, until the passage between Kootubdeah and Matrabari is quite open; then steer direct for the opening, about N.E. by N., in 10 to 7 fathoms, water, taking care to avoid the dry shoals lining the shore on both sides of the entrance: having got just within the Point of Kootubdeah, you may anchor secure in 8 to 10 fathoms, soft ground. From the point of that island a spit extends S.W. by S. several miles, with breakers on it in some places: and a bank stretches from the Mascal shore to the distance of 2 m., both of which will be avoided by keeping the passage quite open, as directed above. It would be improper to run 1 m. within the Point of Kootubdeah, for about 2 m. within the entrance, a bank projects from that island more than half-way across the channel.

The N. Patch Sand, which is steep, with high breakers, least water 4 ft., lies 13 m. to S.S.W. of Kootubdeah Light-house; and from this patch other shoals, with 12 and 15 ft., extend for 8 or 9 m. to the S. by E. This was formerly called the Inner Spit, or Middle Ground, but is now different from what it was thirty years ago. The Outer Spit, from lat. $21^{\circ} 24'$ to $21^{\circ} 33'$ N., is very dangerous, having in one spot, called the South Patch, only 6 ft. water; from whence the depth increases on the N. end of the spit to 7 and 8 fathoms, in lat. $21^{\circ} 35'$ N. Close to the W. edge of this spit, the depth is 10 and 11 fathoms, *decreasing to sea-ward* to 5 and 6 fathoms on what we have called the Great Megna Flat, about 7 leagues to the W. of the spit.

The S. Patch Sand is in lat. $21^{\circ} 31'$ N., and lon. $91^{\circ} 41'$ E., and 24 m. to S.S.W. of Kootubdeah Light. During the N.E. monsoon, the high land is not visible for several days together, and frequently the haze prevents Mascal Island from being seen from the channel between the S. Patch Sand and Middle Ground. This S. or Outer Patch exhibits breakers in a fresh breeze, and in fine weather the rollers on it may be perceived, but the lead affords no guide in approaching. Between it and the Middle Ground, the velocity of the tide at the springs is from $3\frac{1}{4}$ to 4 m. an hour, and in this channel the ground is stiff and good for anchorage. The flood sets towards the entrance of Coxo Bazar and the channel that separates Matrabari Island from Kootubdeah, rendering it doubly necessary to keep a good offing after seeing the White Cliffs.

THE WHITE SANDY CLIFFS, fronting the sea between Mascal Island and Elephant Point, extend from lat. $21^{\circ} 18\frac{1}{2}'$ N. to $21^{\circ} 24'$ N., being 3 leagues to the N. of Elephant Point. The land to the N. of these cliffs is separated from Mascal Island and the coast of Chittagong by the opening or Strait of Cruzcool, which opening has deep water inside, but will only admit of small vessels in the narrow channel between a reef off Coxo Bazar and Red Crab Reef, that stretches from the S. end of Mascal Island about 2 leagues to the S. and S.W. **Red Crab Islet**, lying near the S.W. extremity of this reef, in lat. $21^{\circ} 29'$ N., and about $2\frac{1}{2}$ m. from the S.W. end of Mascal Island, is merely a dry sand, with some shrubs on it, having breakers extending round to a considerable distance, with 10 and 11 fathoms near the W. edge of the reef, and 3 or 4 fathoms near its S. extremity. There are patches of sand to W. of this islet, and at 1 league off there is a depth of 17 fathoms; this gut of deep water extends to the S. end of the N. Patch, and runs up between that shoal and Kootubdeah, only shoaling to 10 fathoms farther N. Between Red Crab Reef and the main land there is a channel leading to Coxo Bazar, and to the S.E. point of Mascal Island; it has from $1\frac{1}{4}$ to $3\frac{1}{4}$ fathoms on the bar, and from 5 to 8 fathoms inside.

The Coast. From the White Cliffs to lat. $20^{\circ} 45'$ N., the coast of Chittagong continues in a narrow strip of land that forms the W. side of the Naaf River; and, except near Elephant Point, which has a reef off it, is safe to approach with tolerable anchorage. Vessels bound to Chittagong, or those that may be driven to the E. by stress of weather in the S.W. monsoon, usually endeavour to make this part of the coast; but it requires great caution, the weather being mostly cloudy or stormy, and the White Cliffs are low and not easily discerned, unless the sun is shining bright in the afternoon. If, therefore, a ship get close in, with a strong breeze, and a tide of 4 knots on the flood, she will not be able to haul out sufficiently to clear the Kootubdeah Sands, more particularly the outer patch, and will therefore be obliged to anchor in a heavy sea, with strong tides, an alternative at all times, if possible, to be avoided. If a ship make the land here, she must haul immediately to the W., to avoid the banks of Mascal and Kootubdeah.

Elephant Point, or Dombak Point, in lat. $21^{\circ} 10'$ N., lon. $92^{\circ} 4'$ E., is 3 leagues S. by E. from the S. extremity of the range of White Cliffs, and may be seen 5 leagues from the deck. A reef projects about a mile from the Point, which should not be approached under 8 fathoms, or $1\frac{1}{4}$ or 2 m. distance. About 3 leagues to N.E. of this Point, there is a sugar-loaf hill. From Elephant Point, the coast of Chittagong runs in a general direction of S.E. by S. to Tek-Naaf.

COAST OF BRITISH BURMAH.

Shapoor Island, the N.W. point, in lat. $20^{\circ} 46' N.$, lon. $92^{\circ} 19' E.$, distant $9\frac{1}{2}$ leagues to the S.S.E. of Elephant Point, and fronting the Naaf River, is $3\frac{1}{2}$ m. in length, surrounded by shoals, which project about 2 m. to the W., nearly joining the shoals off St. Martin Island, which is about 2 leagues farther to S. There is an intricate channel between them, about $1\frac{1}{2}$ and 2 m. to the S. of Shapoor Island, leading into the river, the entrance to which is bounded on the E. side by Cypress Point. Tek-Naaf is a low point of land, a little to the N. of Shapoor Island, and together with this Island forms the W. boundary of the river, which extends in a N. by W. direction nearly parallel to the coast, as far as Elephant Point. There is high table-land on the Aracan Hills, about 20 m. to S.E. of Elephant Point, and N.N.E. of Shapoor. Although the Naaf River has depths of 12 to 8 and 7 fathoms, when inside the bar and outer shoals, yet, in the opinion of Captain Crawford, who took the *Research* and flotilla into this river in Jan., it will always be dangerous for shipping; because, on the flood-tide, the surf and swell run too high in 3 fathoms, water, for ships to cross the outer bar, which has $3\frac{1}{2}$ fathoms, hard bottom, on it at H. W., and this is the safest time to pass between the outer shoals into the river. It is H. W. on F. and C. at 10 h. 0 m.

ST. MARTIN ISLAND, formed of two divisions united by a dry ledge of rocks, extends from lat. $20^{\circ} 34\frac{1}{2}'$ to $20^{\circ} 38\frac{1}{2}' N.$, and its N. end is distant 5 m. due S. from Shapoor, and 4 or 5 m. from the nearest shore: it is low, fronted by a reef on the W. side, which projects also a little way from the S. point, and forms a sort of bar between St. Martin and Shapoor. There are extensive reefs with breakers about mid-way between the Black hummock on the main and St. Martin Island, but near the E. side of the island there is anchorage in 5 and 6 fathoms, where the transports anchored, and procured fresh water from the springs. In fact, this anchorage may be considered as the mouth of the Naaf River; the bar of which might be easily crossed if buoyed.

St. Martin Reef, in lat. $20^{\circ} 38' N.$, lon. $92^{\circ} 14' E.$, is very dangerous, distant about $5\frac{1}{2}$ m. directly W. from the N. part of St. Martin Island, having high breakers on it at times, and it is of considerable extent in a N. by W. and S. by E. direction. Very near it on the outside there are 10 fathoms, water, with 7 to 9 fathoms hard ground, in a safe channel between it and the island. Ships passing this reef in the night should not come under 20 fathoms: and it may be observed, that from this part of the coast soundings extend directly across the bay to Point Palmiras.

Asseerghur Shoal, in lat. $20^{\circ} 28' N.$, about 10 m. to the S.E. of the S. Point of St. Martin Island, and 7 m. off shore, is also dangerous. There is a channel with $6\frac{1}{2}$ and 7 fathoms, water, betwixt it and the main, and 8 fathoms close to it on the outside. The coast between the Naaf and Aracan Rivers is lined by a shoal-bank, having 3 or 4 fathoms on the edge of it in some places, at 2 or 3 m. off shore.

Oyster Island, in lat. $20^{\circ} 12' N.$, lon. $92^{\circ} 33\frac{1}{2}' E.$, and 12 m. off shore, is very little above water, and is small, rocky, and dangerous, having a narrow bank or ridge, with shoal water on it, extending several miles from the Dry Rock in a S.E. direction, and nearly joining another spit of $1\frac{1}{2}$ fathoms, called the **Oyster Reef**, in lat. $20^{\circ} 5' N.$: there is a gap or passage of 6 and 7 fathoms between the island and reef, and from 11 to 10 fathoms, water, close to them on the outside.

Miou, or Mroo River entrance, in lat. $20^{\circ} 15' N.$, 13 m. E.N.E. of the Oyster Island, has a shoal-bank on each side, with $1\frac{1}{2}$ or 2 fathoms on the bar, which lies 4 m. to N.E. by N. of the Oyster Reef. This river is of considerable size, extending inland to the N., and it has been sometimes mistaken for Aracan River. There is a passage of 7 to 6 fathoms betwixt the Oyster Island Reefs and the bank that fronts the mouth of Miou River, and which extends along the coast to the bar of Aracan River. This bank has breakers on it in some parts, and should not be approached even in the N.E. monsoon, under $6\frac{1}{2}$ or 7 fathoms. **Heckford Patch**, with 4 fathoms only, lies 9 m. to S.S.E. of the Oyster Reef, and 12 or 13 m. to S.W. of Savage Island Light-house.

The KOLADYNE, or ARACAN RIVER. **Fakirs, or Mosque Point** (Booda Mokham), in lat. $20^{\circ} 7' N.$, lon. $92^{\circ} 53' E.$, forming the N. boundary of the entrance of this river, is low, and has some rocks, called the Fakirs, extending about $\frac{1}{2}$ m. S.S.E. from the point; these rocks are covered at H. W., and there is a *Red buoy* to mark their S.E. extreme. There is a flag-staff on Fakirs Point. The channel into Aracan River is betwixt the Fakirs and an islet, called the *Savage*, situated near the N.W. point of Bolongo, the W.-most of the Broken Islands. **Akyab Town**, at 2 m. to N. of Fakir's Point, is now an important rice-port, with a Master-Attendant, and Consuls of several nations. Up the Bankshall Creek to the N. of the town, a naval yard has been established. Flat Island, lying 5 m. to N.E. of Fakir's Point, has a mud flat stretching from its S.W. end towards the point, thus narrowing the anchorage off the town; a *Black buoy* marks the S. extreme of this mud-flat.

Light. The light-house on Savage Island, in lat. $20^{\circ} 5' N.$, lon. $92^{\circ} 53' E.$, exhibits a *fixed* light 106 ft. above mean level of the sea, visible 4 leagues. This island lies a mile from the N.W. point of Bolongo Island, and a rocky bank extends between them. A dangerous rock, called Passage Rock, lies about $\frac{1}{2}$ m. to N.W. of Savage Island, with from 15 to 24 fathoms outside of it. The town of Akyab lies $1\frac{1}{2}$ m. to the N. of Fakir's Point. There are $3\frac{1}{2}$ and 4 fathoms on the bar about 4 m. to the S. by W. of Savage Island Light, and 2 m. off the shore of Bolongo; but a depth of 5 fathoms is found to the E. of the *buoy*, which is placed 3 m. due S. of Savage Light; and the depths are from 8 to 10 fathoms along the W. Bolongo coast, at $2\frac{1}{2}$ and 3 m. off.

Directions for Akyab. Ships sailing for Akyab during the S.W. monsoon should steer by night for the Savage Light on a N.E. by N. course; by day they should sight the table-land of W. Bolongo (where a wooden light-house* was built, in lat. $20^{\circ} 1' N.$, lon. $92^{\circ} 56' E.$), bearing between N.E. and N.N.E.; when on the latter bearing, the lead may get soundings of 9 or 10 fathoms (L. W. depths) on the bank which stretches fully 8 leagues to the S. of Akyab Bar. When the light is sighted on the Savage, then bring it to bear N. by E., or N.N.E.; and if they intend to run in during the night with either of these bearings, they will cross the bar in the best water, in 3 fathoms L. W. spring tides. After deepening across it, the course should be altered to N. by W., or even N.N.W., according to the state of the tide and sea at the time, to avoid the W. Peaked Rocks (above water), bearing from the light S.W. by S., distant nearly $\frac{1}{2}$ m. The flood-tide sets in on the rocks. When the light bears E., the course must be altered to N.N.E., and N.E.; having brought the light to bear S.S.E. $\frac{1}{4}$ E., the ship will be inside of Passage Rock (which is 5 to 7 ft. above water, and bears from the Savage Light N.W. $\frac{1}{2}$ N., distant $\frac{1}{2}$ m.), and should then steer N.E. by E., to avoid the reef projecting from Fakir's Point; some of the rocks are above water at half-ebb. There is a *Red* buoy placed off these rocks, in about 9 fathoms, which, with attention, may be seen in a clear night without the moon; and after bringing Fakir's Point to bear N.W. by W. to W.N.W., the ship should anchor. A stranger should not attempt to run in at night, particularly in the rains, except at H. or L. W., as the ebb-tide runs very rapidly, in strong eddies off Passage Rock, over the W. flat, and the flood in strong eddies upon the rocks.

During the N.E. monsoon, ships bound to Akyab from the N. should not shoal under 15 fathoms, till they make out the W. Bolongo table-land, or Savage Light (from aloft) bearing E. by N.; then steering due E., till Savage Light bears N. by E., they will pass between the Oyster Reef (which is distant from the Savage Light 15 m. due W.) and the Heckford Patch (bearing from the light about S.W., 12 or 13 m. off). Steer for the light N. by E. to cross the bar to the W. of the buoy. After deepening over the bar, haul up N.N.W. to clear the Peaked Rocks to the S.W. of the light. Then N.E. or more E. (according to the tide), to round the *Red* buoy off the Fakirs; when haul in N. by W. or N.N.W. for the inner flag-staff, anchoring in 3 or $3\frac{1}{2}$ fathoms, abreast the *Black* buoy, which lies on the S. end of an extensive shoal projecting from Flat Island, which divides the river into two channels above the town.

Although in favourable weather Savage Light is seen outside the reef in 16 to 17 fathoms, water, yet in hazy or rainy weather it might be obscured. In such case, the lead should be the guide; the navigator feeling his way round the bank of soundings in 10 or 11 fathoms (L. W. depths); thus he would avoid the Oyster Reef and Heckford Patch, hauling close round the S. side of the latter; and he might approach the light within 9 or 10 m., when bearing N.E. by N. Steering boldly in to sight it, to the N. of lat. $20^{\circ} 1'$, would endanger the safety of the vessel, by suddenly falling upon the Oyster Rock or Reef before sighting the light-house. Strangers should not on any occasion make use of the channel inside of the Oyster Rock or Reef.

Arriving off Akyab in ballast during the N.E. monsoon, ships should anchor out in 8 or 9 fathoms outside the bar, and there get rid of as much ballast as safety permits. This will avoid the expense of discharging it inside the river by boats, for there is a strict prohibition against throwing it into the river. The table-land of the W. Bolongo (though altered in appearance since the trees on its N. part were felled to make a site for a light-house) may be seen sometimes at 30 m., and this high land is darker than that to N. of Akyab, though some of the more N. peaks near Miou River are higher and discernible at a greater distance.

Tides. It is H. W. at the anchorage off Akyab at 9 h. 45 m. on F. and C. of moon, and the greatest rise in Feb. was 9 ft. Velocity of tide in the river from 3 to $3\frac{1}{2}$ m. per hour on the springs, and from $1\frac{1}{4}$ to 2 m. on the neaps. Variation, $2^{\circ} 15' E.$

The Broken Islands, called formerly the W., the Middle, and the E. Bolongo, are three long and narrow islands immediately to the S. of Aracan River, extending about 5 leagues N.N.W. and S.S.E., parallel and near to each other. **Borongo, or Bolongo**, the W.-most, has a reef projecting

* The W. Bolongo Light is said to be *not lighted* now, though retained on the charts.

from its S. point, and there is a reef and several small islands off the S. point of **Peny-Kyoung**, the Middle Island. Between these two there is good anchorage in 8 or 10 fathoms, mud, or in 5 fathoms farther up the Strait, where ships might be sheltered from all winds but those that blow from the S. This has been named **Research Strait**, and has only 2 and $1\frac{1}{2}$ fathoms at its N. part; consequently will not admit of ships passing through into Aracan River. These islands are mountainous, woody, and rugged, without any appearance of inhabitants or cultivation; and the whole of the coast of Aracan, both to the N. and S. of them, has a similar appearance, presenting a most dreary aspect when viewed from sea. The S. ends of the Broken Islands, although bounded by rugged black rocks, are not very dangerous, as most of these are visible and do not extend far out. About 4 leagues to the W. of the W. Borongo, and parallel to it, or stretching for many miles to the S., from the Outer anchorage in 9 fathoms, off the Akyab Bar, there is a long bank, with 9 fathoms, water, in some parts, and 16 or 17 fathoms between it and the island; and at 3 leagues due S. from its S. point, there is a patch of 7 fathoms in lat. $19^{\circ} 40'$ N., with 22 and 20 fathoms between it and the S. Rocks, which stand in a line for some 6 m. to S.S.E. from the S. point of Peny-Kyoung Island, and united to that island by a ridge of rocks and islets.

THE TERRIBLES, in lat. $19^{\circ} 22'$ to $19^{\circ} 27'$ N., distant from the shore 12 m., form three visible groups of rocks extending in a N.N.E. and S.S.W. direction, some of them about 14 ft. above water, with others under water not yet explored. The N. Rock is the largest, from which a spit is said to project to the N.W. for some distance, with 20 fathoms close to it on both sides. The middle group is about a mile S.S.W. from the N. Rock. The S. group, consisting of several low rocks, is $4\frac{1}{2}$ m. S.S.W. $\frac{1}{2}$ W. from the N. Rock, and breakers have been seen 1 m. to the S. of it. Breakers have been also seen 2 m. W. by S., and $\frac{1}{2}$ m. to N. from the N. Rock, which shows there are sunken dangers around, and that ships should not come within $2\frac{1}{2}$ m. of the dry rocks. But the greatest danger to vessels entering Kyouk Phyoo Harbour, round the N. side of the Terribles, is a **submerged rock**, lying nearly 8 m. due N. of the N. Rock. A light-house is proposed on the S. point of these dangerous rocks in lat. $19^{\circ} 22'$ N., lon. $93^{\circ} 17'$ E.

The N. Rock is in lat. $19^{\circ} 27'$ N., lon. $93^{\circ} 20'$ E., bearing S.E. $\frac{1}{4}$ S. from the S. point of the W. Bolongo, distant 29 m., or 45 m. on a S.E. by S. bearing from the Savage Light; and W. by S. 11 m. from the Pagoda Rock, in Kyouk Phyoo Harbour. When coming from the W., the high peak in Combermere Bay is discernible at 8 or 9 leagues' distance in favourable weather, and it is in transit with the N. Rock of the Terribles, bearing N.E. $\frac{1}{4}$ E. From the N.W. point of Cheduba, the S. group of the Terribles is about 11 leagues distant, bearing N.N.W.; near to it on the W. side there are 20 fathoms, water, and the depths increase regularly to 100 fathoms, no ground, about $6\frac{1}{2}$ leagues to the W. Ships passing along this coast ought not to approach the Terribles in the night, under 28 or 30 fathoms; and in crossing the entrance of Aracan River they should not borrow toward Oyster Island, or the Heckford Patch, to less than 20 fathoms; but when to the S. of that, and if Savage Light is seen from aloft, they may haul to the S.E. and get a cast on the 9 and 10 fathoms bank which stretches many miles to the S.E. of Heckford Patch.

Hunter Bay and Combermere Bay, situated between Akyab and Kyouk Phyoo, little known to navigators, require to be properly examined. The rocks and islets are innumerable. The largest island between Hunter and Combermere Bays has some high land, very conspicuous from sea-ward, in clear weather from a distance of 40 m.: the S. Peak bears about E.S.E. distant 11 leagues from the table-land of W. Bolongo. Hunter Bay has a channel on either side of a great bank which lies off the S.E. coast of the Mengbrah sub-division of the Akyab district, and this bay is the outlet for trade of the important towns,—Mengbrah, Mraboung and Talak. Combermere Bay, though full of rocks and shoals, is the outlet of the Aeng River, which is navigable by boats up to the town of Aeng, 45 m. from its mouth. From Aeng a mountain-pass leads over the Yeomaloung Mountains, towards Ava, the capital of the Burmese kingdom.

KYOUK PHYOO HARBOUR (Fort Dalhousie), in lat. $19^{\circ} 26'$ N., lon. $93^{\circ} 32\frac{1}{2}'$ E., lies directly to the E. of the Terribles,* inside the N. point of Ramree Island. This point called Flag-staff or Sandy Point is about 6 m. E. of the N. end of Saddle Island, which lies on the S. side of the entrance channel, having reefs projecting 2 m. from its N. point. The channel is bounded on the N. side by reefs, some of which are detached, and others extend from the islands on that side, which require great caution in passing. Kyouk Phyoo is a military station, and Fort Dalhousie stands on the N. point of Ramree Island. The town is much sheltered from the violence of the S.W. monsoon by some hills to the S. and S.W.; these range in height from 500 to 1,000 ft.

Pagoda Rock, a conspicuous *white* rock, bears N.W., distant 4 m. from the flag-staff; it

* A light-house is proposed for the S. Terrible in lat. $19^{\circ} 22'$ N., lon. $93^{\circ} 17'$ E.; and as Kyouk Phyoo rises in importance, a harbour light with other beacons will be needed.

lies to the W. of other large islands, which form the N. side of the harbour. From the rocky islets off the S. end of Peny Kyoung Island (the Middle Bolongo), a bank of soundings with 9 and 10 fathoms, extends to within 2 leagues of the N. Terrible, and thence its S. edge goes straight to the Pagoda Rock.

Entering Kyook Phyoo from the N., during the night, a careful navigator might feel his way round this bank, and approach the entrance between the buoys. In steering for the N. end of Saddle Island, which is in lat. $19^{\circ} 25' N.$, it should not be approached under $2\frac{1}{2}$ m., and when it bears S., the Pagoda Rock should be brought to bear E.N.E. This rock is conspicuous, being white-washed, and lies $4\frac{1}{2}$ m. to the N.E. of Saddle Island. The fair channel course into the harbour is then about E. by S., between two buoys; the N. buoy (*Red*) marks a detached reef; the S. one (*Black*) marks the shoals off the N.W. point of Ramree. The breadth of the channel between these dangers is little more than $\frac{1}{2}$ m.: they lie 2 m. to the W.N.W. of Sandy Point, and at 1 m. to N.W. of this point lies the **Reliance Rock**, with a *Black* buoy, between which and Quoin Island the channel is a mile wide, the S. point of the island having a reef close to it, which bounds the channel on the N. side of the harbour. Buoys being now placed on all these detached shoals, which bound the entrance, this is made a very fine harbour. The soundings, to the N. of Saddle Island Reefs, are no guide, being deep and with overfalls. A chart to show the bearings of the land-marks is necessary. In the narrow part, between the buoys, the depths are irregular from 9 to 26 fathoms, continuing the same until near Sandy Point, where they decrease to 7 or 9 fathoms, at the anchorage off the village of Kyook Phyoo.

Coming from the S. to Kyook Phyoo Harbour, vessels may pass about 2 m. to the E. of the Terribles; but this passage requires caution, as the **Irrawaddy Shoal** lies $3\frac{1}{2}$ m. W. from Saddle Island, and $4\frac{1}{2}$ m. E. by S. from the N. Rock of the Terribles, being nearly in the middle of the fairway, with only 2 fathoms, water, on it, and shows breakers when there is much swell. The passage between this danger and the Terribles is, however, $3\frac{1}{2}$ m. wide, with from 12 to 15 fathoms, water, and may be occasionally used in favourable weather, by keeping in mid-channel; but, between the Irrawaddy Shoal and the reef surrounding Saddle Island, a ship ought not to attempt a passage; **Dacey Shoal** lies 2 m. to the N. of Saddle Island, about 4 m. E.N.E. from Irrawaddy Shoal, and $3\frac{1}{2}$ m. to S.W. of Pagoda Rock.

Fletcher Hayes Strait begins about $2\frac{1}{2}$ or 3 m. to the E.S.E. of Kyook Phyoo, stretching to the S.E., separating Ramree from other islands, and from the continent. These straits in some parts branch out into an extensive inland navigation, completely land-locked, with good depths of water, and interspersed with many beautiful islands.

Ramree Island. From Fort Dalhousie Flag-staff, the shore trends to W.S.W. and S.W. for about 2 leagues to the Outer Peak Hill, close to the sea. The sea-face thence takes a general S.E. direction for 8 leagues to Rocky Point, which forms the N. side of the entrance to Cheduba Strait. **Research Rock** is about 6 m. S. from Saddle Island, and $1\frac{1}{2}$ m. from the Ramree Shore; and there are also several other straggling rocks contiguous to the W. coast of that island, but not so far out as the former. A little to the S. of the Research Rock, the soundings along the W. coast of Ramree are tolerably regular, and ships may approach to 9 or 10 fathoms, about 4 or 5 m. off shore.

CHEDUBA, or KEDOOBA, is a moderately high island, extending from lat. $18^{\circ} 40'$ to $18^{\circ} 56' N.$, its extreme width being about 15 m. It is bounded by reefs and islets, which project several miles to sea-ward, and which ought therefore to be approached with great caution in the night. The extreme W. rocks of the reef lying off the N.W. point of Cheduba are in lat. $18^{\circ} 55\frac{1}{2}' N.$, lon. $93^{\circ} 26\frac{1}{4}' E.$, bearing from the point N.W. $\frac{1}{4}$ N. 5 m. From these extreme rocks the reef runs E. by N. 4 m., having along this line two small islands: **Beacon Island**, lying E., or $\frac{1}{2}$ m. within the extreme rocks, has on it a beacon of stones about 60 ft. above H. W. mark, visible 9 m.; and Sandy Island, not so high as the other, lying $\frac{1}{2}$ m. from the E. extreme of the reef, which bears from it E.N.E. Both islands have been planted with cocoa-nut trees. The soundings in the neighbourhood of the reef are regular, ranging from 4 fathoms, $\frac{1}{2}$ m. off its N. face, to 8 and 9 fathoms, 3 m. off it; while at that distance off the N.W. and the W. ends, 16 and 17 fathoms are found. An outlying rock, with 7 ft. water on it, is found N.E. by E. of Beacon Island, distant $\frac{1}{2}$ m.

In the N.E. monsoon the anchorage is good in all these soundings, but the reef affords no shelter from the heavy swell of the S.W. monsoon; at which season the channel between Cheduba and Ramree Islands, after carefully rounding the E. extreme of the reef, is open and available for that purpose. The tides run E. and W. along the reef $1\frac{1}{2}$ knots in the neaps, and nearly 3 knots in the springs, when they sometimes rise 8 ft. They are irregular in time. H. W. at F. and C. off the N. coast of Cheduba at 9 h. 30 m.

Ships coming in from the W., along the N. side of Cheduba, ought not to approach the reef under 11 or 12 fathoms, water, for near it the bottom is mostly rocky, and the soundings not very regular. Being within the reef, the water shoals gradually from 7 to $5\frac{1}{2}$ fathoms, and the course should not be more to the S. than E. by S. until well over to the Ramree shore, where the soundings are more regular than on the Cheduba side, which is very flat and shoal to a considerable distance. By steering along the Ramree side at 2 to $1\frac{1}{2}$ m. distance, there will seldom be less than 5 fathoms, and when to the S. of *Rocky Point Bay*, the water will deepen to 6 or 7 fathoms. Between the Ramree shore and Cheduba, about 5 m. to the N. of the anchorage, and about $1\frac{1}{2}$ m. from a point of Ramree, there are two rocky shoals; these dangers require great care, as they lie in the fair channel, bearing about E. $\frac{1}{2}$ N. from the N. point of Cheduba, and N. by W. from its N.E. point, and opposite to a point on the Ramree shore, on which stands a bungalow. A ship should have a good chart, and in passing these dangers should keep within $1\frac{1}{2}$ m. of the Ramree shore on the edge of the Mud Bank, and when the N. point of Cheduba bears W. by S., a moderate high and round island will appear to the E. of Cheduba, bearing about S. by E.; by steering for it, when past the dangerous rocky patch, as mentioned above, she will shoal gradually over to the W. towards the town of Cheduba, where she may anchor in 4 or $4\frac{1}{2}$ fathoms, with Round Island bearing S. by E., and the town pagoda W. $\frac{3}{4}$ S. This pagoda has on its top a brazen image of a large bird, and is situated in lat. $18^{\circ} 46' N.$, lon. $98^{\circ} 45' E.$

The Roadstead. In the Cheduba Road the tide rises from 6 to 10 ft.; H. W. about $11\frac{1}{2}$ h. at F. and C. of moon. Ships may fill water at half-ebb in their own boats, but it will be procured more expeditiously by the country boats. The landing-place is near a small wooden bridge, at a wharf about 2 m. up the river on the starboard side, where is a bazaar well supplied with poultry, hogs, goats, fruits, and vegetables in abundance, at reasonable prices, and of excellent quality. Rice, tobacco and petroleum oil are the chief exports. From the entrance of the river, mud flats stretch $1\frac{1}{2}$ m. out, making the approach difficult to a stranger; but inside, although narrow and winding, there is water sufficient for large boats at all times of tide.

The S. end of Ramree Island, forming the N.E. side of Cheduba Strait, is of moderate height near the sea, and extends from Rocky Point (in lat. $18^{\circ} 59' N.$) about 6 leagues to S.E. by E.; thence the E. coast of the Island turns round to N. by E., and there forms Ramree Harbour (sometimes called Amherst Harbour). The S. point of Ramree, off which are several islands, lies directly E. from Cheduba Anchorage: betwixt this point and the nearest island there is a passage, with from 3 to 7 and 10 fathoms, leading into the large space called Ramree Harbour; another passage leading into it from the S., is along the E. side of the chain of islands that projects from the S. point of Ramree in an S. by E. direction. The largest, and nearest to the point, is named Amherst Island, or Juggoo; the next, Adam Island; the third, Still Island; and the two S.-most, Wyndham and Harrison Islands, which are small. These islands are lined by rocks and shoal water, and an extensive shoal projects from the E. shore also nearly over to the islands, greatly contracting the channel, and rendering it unsafe to the E. of Amherst Island: the depths in it are generally irregular, from 7 to 4 or $3\frac{1}{2}$ fathoms; but the best passage is between the N. end of Amherst Island and Ramree Point, and when inside of this point the depths increase; but there are several shoals in this inlet, which render it difficult navigation, and it is necessary to have a good chart to lead a vessel into Amherst Harbour, which has depths of $3\frac{1}{2}$ to 4 fathoms, water, and is safe.

Winds. Although a brisk Southerly wind, with a N. current, is sometimes experienced on the coasts of Aracan and Pegu in the N.E. monsoon, the prevailing winds are from W.N.W. and N.W. in the day, and from the N. in the night, seldom veering to N.E. It may, therefore, be preferable for a ship leaving Cheduba Road or Ramree Harbour to proceed to sea by the S. Channel when the N. winds prevail, and not lose time beating to the N. and W. round the reef off the N. end of Cheduba. The S. Channel is formed by the Cheduba Flat, Round Island, and Flat and False Islands to the W., and the Ramree Chain to the E., and is continued in a S.W. direction to the S. of Tree Island, which must have a wide berth of 2 m.; it is dangerous to approach, being surrounded by straggling rocks, which extend to the S.E., also to N. and to N.W., to the distance of $1\frac{1}{2}$ m.

The N.W. Point of Cheduba is a round volcanic hill, 200 ft. in height, having casuarina trees only growing on it. It is connected with the N.W. reef by a series of detached rocks, both above and below water, with deep channels between them, through one of which an entrance was found into a small, and (in the N.E. monsoon) good harbour on the N. coast of the island. This was named *Port Childers*; its harbour rock lies S.S.E. from Beacon Island, distant $1\frac{1}{2}$ m. This rock is 20 ft. high, 50 or 60 yards in length, and is the largest of the rocks in its neighbourhood. From its W. side a reef, whose extreme is above water, extends 1 m. At $\frac{1}{2}$ m. to S.S.W. of the harbour

rock, is a small rock above water, and about $\frac{1}{2}$ m. to the S. and S.E. of the latter are two sunken rocks, forming the N. limit of the entrance-channel. This channel, which runs E. and W., has 6 fathoms in its centre, 4 fathoms close to the two N. rocks, and 5 fathoms near the reef forming its S. limit. The reef, from its resemblance to the ribs of a wreck, is named Rib Reef. The channel is $\frac{1}{2}$ m. wide, and the land and sea-breezes blow directly through it alternately. There is no passage for ships from Port Childers into the Cheduba Channel; but in coming out of the port to the W., a clear passage exists close to the S. of Rib Reef; but this is not recommended, and the navigator must have a good chart. In entering the port, when the N.W. point of Cheduba bears S.S.E., steer E.N.E. until it bears S. by W. The best anchorage will then be found with Sandy Island bearing N., in 4 fathoms, clay and mud. **Henry Rock** is a detached mass, 35 ft. high, visible 6 or 7 m., and bearing from the N.W. point of Cheduba W.S.W. 2 m. It is the largest mass off this part of the coast, and has a considerable reef surrounding it. There is a narrow channel inside, but the tides render it very dangerous. Throughout the line of coast, the safe limit of approach in ordinary navigation is 20 fathoms by day, and from 60 to 70 by night, the former clearing all the dangers about 2 m. To the W. and N. of Beacon Island, in the entrance of Cheduba Strait, the soundings extend a much greater distance off shore than to the S. of it, where at a distance less than 10 m. no bottom is found at 120 fathoms.

The **W. Coast of Cheduba** has small detached rocks scattered along it at the distance of less than 2 m. off shore; but these do not prevent the practicability of anchoring in various parts during the N.E. monsoon, when the coast is visited by native craft for rice. This article may be procured in quantity, cheap and good; also cattle, poultry and fruit. Wood is easily procured, but water not without trouble. There is little inducement, however, to visit this coast, and vessels not bound to its ports would do well to keep clear of it in the S.W. monsoon. A range of hills runs parallel to the S.W. coast of Cheduba; the **W. Hill**, in lat. $18^{\circ} 47' N.$ is 1,300 ft. high; **South Peak**, near the S. extreme of the island, is 1,700 ft. in height, and may be seen beyond the limit of soundings to sea-ward. As the S. point of the island is approached, **Pyramid Rock** will be seen; it is a remarkable pinnacle, rising 200 ft. out of the water, and lying 1 m. from the shore: it bears about W.S.W. from **South Peak**. There are dangerous reefs to the S., between **Pyramid Rock** and **Flat Island**; so that when working along shore to the N. of **Hill Island**, the **Pyramid** should never be brought to bear to the N. of N. by E. The in-draft between Cheduba and **Flat Island** is very great.

ISLANDS to S. of CHEDUBA. **Flat Island** is about 4 m. long from N. to S., and is very low, except near its centre, where there is a volcanic hill about 200 ft. in height. It is separated from the S. part of Cheduba by a channel varying from 2 to 4 m. in width. **Hill Island**, which is small and high, lies close to the S. of it, a reef connecting them. **Reguain** is the native name of **Flat Island**. **False Island** is a small, low, sandy island, bearing from the volcano of **Flat Island** E. by S. $5\frac{1}{2}$ m.

West Shoal is a dangerous reef, $\frac{1}{2}$ m. in diameter, with very irregular soundings round it. The sea constantly breaks on it, and at L. W. the points of rocks are seen between the rollers. Rocks extend in a line between this Shoal and **False Island** N.N.E. 8 m.: a remarkable one, called **Sail Rock**, lies about $2\frac{1}{2}$ m. to E. by N. from **West Shoal**. **Heywood Channel** (named from the late Captain Peter Heywood, R.N.) runs between the shores of **Hill** and **Flat Islands** on the W., and the reefs and rocks extending from **West Shoal** to **False Island** on the E. The course through it is N.E. by N., in from 13 to 5 fathoms, sandy bottom. There is good anchorage in moderate weather. This channel leads to and from the port of **Amherst**, or **Ramree Harbour**, and the secure anchorages inside the Islands of Cheduba and **Ramree**.

Tree Island, said to be named **Negamale** by the Burmese, in lat. $18^{\circ} 26' N.$, lon. $93^{\circ} 56' E.$, about a mile in length and 250 ft. in height, bears from **Hill Island** S.E. $\frac{1}{2}$ S. $10\frac{1}{2}$ m. A reef of straggling rocks extends from its S. point for $\frac{1}{2}$ m., and detached rocks are found off its E. shore. There is also a 4-fathom patch $\frac{1}{2}$ m. from its N.W. point. This Island and **West Shoal** form the sea entrance to a second channel leading to the inner anchorages of Cheduba and **Ramree Islands**. The N.W. limit of this, called **Childers Channel**, is the range of reefs between **West Shoal** and **False Island**, and its S.E. limit is **Tree Island**, and a large rocky reef about $3\frac{1}{2}$ m. N. by E. $\frac{1}{2}$ E. Between this reef and the **Sail Rock** the channel is $4\frac{1}{2}$ m. wide. The course through the fairway is N.N.E. in from 15 to 9 fathoms, water. The superior width and depth, and the clear approach to **Tree Island**, avoiding the danger of **West Shoal**, seem to give this channel the preference over the **Heywood Channel**, but for both a good chart is necessary. The tides are strong through both. **Tree Island** is said to have a pool of water on it.

Nerbudda Rock bears S.E. $\frac{1}{2}$ E. from the centre of **Tree Island** 5 m. It is a small pinnacle, awash at L. W., with a small break of sea on it. Six fathoms are found close round it, and

10 fathoms within a mile. To avoid it from the W., Tree Island must not be brought to bear to the W. of N. by W. There is a clear channel between it and the S. reef of Tree Island; but it is preferable to round the latter. S.E. by S. about 14 m. from Tree Island is the **Four-Fathom Shoal**, an extensive coral-bank, with very irregular soundings. It bears from the Nerbudda S.S.E. 7 m., and from Foul Island, N. by W., distant 4 leagues. On either side of this bank, between it and Foul Island, or between it and Nerbudda Rock, there are safe channels, leading from the S. entrance of Cheduba Strait to sea-ward. In the N. Channel the least water is 12 fathoms, with Tree Island N.N.W. $\frac{1}{4}$ W., 7 or 8 m. off. The channel to the S. of the Four-Fathom Bank is contracted by **Brougham Shoal**, on which the sea breaks, bearing N.N.E. $3\frac{1}{4}$ m. from Foul Island. This shoal is a patch of rocks a mile long, having 5 fathoms alongside of it, and from 24 to 27 fathoms within a mile.

FOUL ISLAND, in lat. $18^{\circ} 3' N.$, lon. $94^{\circ} 7' E.$, is about 20 m. off the coast, and 25 m. about S.S.E. from Tree Island. It bears W. by N. from a point called Bluff Cape 7 leagues. Foul Island may be seen 8 leagues distant, and is 2 m. long, of conical form, its centre being *stated* as 500 ft. high; the N. end terminates in a low point, with a remarkable tree on it, and the whole of the Island is covered with trees; and to the N.E. of it there are islets and rocks, with a reef partly above water, stretching S. from the outer or S.-most of these islets above 1 or $1\frac{1}{4}$ m. Abreast this reef, the depth at 2 or 3 m. distance is 20 fathoms. **Vestal Shoal** (breaking generally) bears E. by S., and is 6 m. from Foul Island. **William Shoal**, at 8 m. to E.S.E. of the Vestal, has only 2 fathoms, water, on its extremes, and from 5 to 7 between them, the shoal being a mile in length N.E. and S.W. **Satellite Rock** is *said* to lie about 4 m. to N. by E. of William Shoal.

SANDOWAY ROAD, in lat. $18^{\circ} 34' N.$, lon. $94^{\circ} 13' E.$, formed inside the reefs at the mouth of the river of this name, has anchorage from 6 to 5 fathoms; and Sandoway Town, which lies about 8 m. up the river in a S.E. direction, is a place of some consequence. The channels between the reefs leading to the road require care from strangers; there is one from the S. and another from the N., exclusive of that between Tree Island and Foul Island. About 2 leagues N. from Sandoway Road, there is a town and pagoda near the shore, opposite to which lie the Osprey and Gunga Saugor Reefs, 6 m. off shore, having soundings of 4 to 7 fathoms between them, and the same depths near the coast from thence to Sandoway Road. **Andrew Bay**, in lat. $18^{\circ} 17' N.$, is about 5 leagues to S. of Sandoway; it has deep water, and is partly sheltered from S.W. winds by an extensive reef stretching to the W. from the S. point of this bay; on this reef are the Thames Rocks.

Ships intending to anchor in Sandoway Road should have a good chart, as the channel from the N.W., though wide, is bounded on the W. side by False Island and Tree Island Reefs, and on the E. by the Osprey, Gunga Saugor, and other rocks. There are several peaked hills $2\frac{1}{4}$ or 3 leagues inland to the N. of Sandoway River; but Sandoway Peak is close to the sea, about $2\frac{1}{4}$ m. S.E. from the isle and reef that bar the river's mouth, which peak bears E.S.E. from Round Island, and is an excellent mark when visible, as the line drawn between these objects leads clear *through* the channel, but near to the S. end of Gunga Saugor Rocks, which lie 4 m. W. of the anchorage: it is therefore right, after being $2\frac{1}{4}$ or 3 leagues to the E.S.E. of Round Island, to keep a little outside of the direct or transit line between Round Island and Sandoway Peak, until past Gunga Saugor Rocks, then haul in E. or E. by N. for the anchorage to the N.W. of the isle and reef that front the mouth of Sandoway River.

On the main land to the S.E. of Ramree a triple ridge of regular sloping mountains, called the Yeomaloung, divides the provinces of Aracan and Pegu; their S. extremity is at the Keintalee-Khyoung, in about lat. $18^{\circ} N.$; the coast of Pegu extends in a S. direction from thence to Cape Negrais, forming several bays, not affording safe shelter for large ships, and having some groups of islets and dangers in its vicinity.

Soundings. When to the N. of Foul Island and Andrew Bay, the main land may be approached to 16 fathoms in coming from the S. along the coast towards Cheduba Strait. The soundings between Foul Island and the main are generally from 20 to 30 fathoms; within 4 m. of Bluff Cape there are 21 fathoms, the bottom mostly mud, although in some parts it is hard sand, about 3 leagues off shore. About 3 and 4 leagues S. from Foul Island the depths are from 38 to 46 fathoms, and to the W. of it, at a few miles' distance, they soon increase to 55 and 60 fathoms, and a little farther out there is no ground. Ships passing outside this island in the night should not come under 40 fathoms, nor under the same depth in passing outside Cheduba and the bank and islands projecting from it to the S.; about 4 or 5 leagues W. of that island the bank has a sudden declivity from 60 or 70 fathoms to no ground.

Close to William Shoal the depths are 24 and 23 fathoms, decreasing inside to 15 fathoms within a mile of Bluff Cape, which cape has a reef around it to $\frac{1}{4}$ m. distant, and a bay on its

N. side, at the bottom of which there appears the entrance of a river. A ship passing inside of William Shoal ought not to deepen above 20 fathoms towards it, nor approach Bluff Cape under 16 fathoms.*

COAST OF PEGU.

Bluff Cape, or Keintalee Point, in lat. $17^{\circ} 58' N.$, lon. $94^{\circ} 27' E.$, is just to the S. of the Keintalee-Khyoung, the river which separates the provinces of Aracan and Pegu. In lat. $17^{\circ} 48' N.$ there is a mountain, and $3\frac{1}{2}$ m. to the S. of it a Quoin Hill, both near the coast to the N.E. of Brown Cape, which in this part has several reefs and isles projecting 2 to $3\frac{1}{2}$ m. from it, and the outer extremity of the reef that surrounds **Rocky Islet** (which is to W. of Quoin Hill), in lat. $17^{\circ} 44' N.$, is nearly $2\frac{3}{4}$ m. distant from the nearest shore, and there is a 6-fathoms rocky patch 1 m. W. $\frac{1}{2}$ S. from the outer verge of the reef. The depths near this patch on the outside are 23 and 24 fathoms, and inside, close to the reefs and isles, from 10 to 5 fathoms.

GWA, or KHWA ISLAND, in lat. $17^{\circ} 33\frac{1}{2}' N.$, lon. $94^{\circ} 34' E.$, lies $1\frac{1}{2}$ m. from the shore, and is of middling height, having a coral bank extending about 3 m. to the W. of it, with irregular soundings from 18 to 8 fathoms, 22 on the outer edge, and 30 to 33 fathoms at a small distance from the verge of the bank. To the N.E. of Gwa Island there is a harbour for small vessels, at the S. part of which is the entrance of the small river, and Gwa Town, built with bamboos and mats, with a cultivated country around. From Keintalee Point to Gwa, the coast goes about S. by E. 9 leagues. Rocky Islet (to W. of which a 6-fathoms shoal is marked) lies 4 leagues to N.N.W. of Gwa Bay. Between Gwa Island and Broken Point, opposite to the Calventuras, there are several indentations in the coast fronted by reefs.

Tides. H. W., on F. and C., at $11\frac{1}{2}$ h., spring rise 6 ft.

ST. JOHN, or CHURCH ROCKS, in lat. $17^{\circ} 27\frac{1}{2}' N.$, lon. $94^{\circ} 23' E.$, bear from Gwa Island S.W. by W., distant 12 m., and from the shore the same distance; they are four in number, one of them large, and about 16 ft. high, the other three small and near each other. When they bear about S.W. the large one resembles a country church with a square tower on its W. end, from which they have been named. Very near these rocks there are 20 fathoms, water, and a little distance inside, the depths are 35 and 36 fathoms, soft ground, decreasing pretty regularly towards the shore; but the latter should not be approached under 22 fathoms, if working between it and Church Rocks in the night, nor should the depth be increased above 34 fathoms towards those rocks.

The Coast between Foul Island and Church Rocks may, in some places, be borrowed on to 15 or 16 fathoms in working, which will be about 2 m. off shore; the depths from 2 to 4 leagues off are 26 to 40 fathoms, increasing fast to the W. of Church Rocks to no ground; therefore, a ship passing outside of them in the night should keep in deep water, not under 56 or 60 fathoms. There is a hill called Round Hill in lat. $17^{\circ} 14\frac{1}{2}' N.$, and another called Peak Hill in lat. $17^{\circ} 10' N.$, from the latter of which the land projects 2 m. in a point to the N., and **Sandy Isles**, surrounded by rocks, stretch $1\frac{1}{2}$ m. to the W. of that point, having shoal soundings of 5 and 6 fathoms, rocky ground, extending $1\frac{1}{2}$ m. farther. The deep bay, to the N. of the Sandy Isles, seems to afford anchorage in 6 or 7 fathoms to the N.N.E. of Peak Hill.

CALVENTURA ROCKS bear from Church Rocks S. $\frac{1}{2}$ W., distant 11 leagues; they form two divisions, bearing from each other N.W. and S.E., distant 5 or 6 m., the body of them being in lat. $16^{\circ} 53' N.$ The N.W. group consists of seven black rocks, in lat. $16^{\circ} 55' N.$, lon. $94^{\circ} 15\frac{1}{2}' E.$, of different magnitudes and forms; one of them resembles an old church with a mutilated spire; another is much larger at the top than at the base. The S.E. division consists of two high rocky islands, covered with trees and bushes, connected by a reef of rocks, with 5 to 7 fathoms, water, upon it, having also a single rock dry at L. W., about half way between the islands. Between the Calventura Rocks and Broken Point on the main there is a safe channel, about $4\frac{1}{2}$ m. wide, with 20 and 22 fathoms, soft ground, in mid-channel, and 15 or 16 fathoms, hard sand, towards the rocks or the shore; about $\frac{1}{2}$ m. inside the E. rock, there are 6 and 8 fathoms, water. These two rocky isles bear nearly N. and S. from each other, distance $2\frac{1}{2}$ m.

Broken Point, in lat. $16^{\circ} 55' N.$, abreast the Calventuras, forms the S. side of the Kyoung-tha River. From Kyoung-tha Town there is a road, leading over a mountain-pass to the great town of Bassein, which is only about 30 m. off in a S.E. direction. Broken Point bears about S. by W. 9 leagues from the similar projection that forms the S. side of the Baumi-Kyoung Bay.

* Heckford's "Coasting Guide," an excellent authority, says that the rocks, shoals, and islands, between Cheduba and Cape Negrais, are correctly laid down on the survey by Captain Daniel Rose, I. N.

Between them the coast projects most abreast of the Peak Hill and Sandy Isles. From Broken Point, abreast the Calventuras, a reef extends to the N.W. about 1 m., with a rock on its outer edge dry at L. W.; and to the N.E. of the point the coast forms a bight, with a small river, fronted by a high island, and contiguous reefs. About 4 m. to the N. of Broken Point, and $1\frac{1}{2}$ m. off shore, there is a sandy island with trees on it, and $1\frac{1}{2}$ m. to the N.W. of the latter a remarkable Brown Rock, which is surrounded by a reef.

In passing along the coast from the Church Rocks to the S., a ship may keep between 85 and 23 fathoms, and in the latter depth she will be about 6 m. off shore. Passing betwixt the Calventuras and the main, she should not, in turning, borrow nearer to the Sandy Isles and Broken Point than 13 fathoms, which is usually about 2 or $2\frac{1}{2}$ m. from the shore; and the Brown Rock Reef should not be approached under 16 fathoms; neither should the coast be borrowed on under this depth to the E. and S.E. of the S. Calventuras, as some islets and reefs lie $1\frac{1}{2}$ m. off shore, where the water shoals on the verge of some of them, from 15 soft to 8 fathoms, hard at a cast. Ships which pass outside the Calventura Rocks ought to keep on the edge of soundings, and with great caution not to come under 50 or 60 fathoms in the night, which will be but a small distance from the outermost rocks, there being 44 and 46 fathoms when they bear E. about $1\frac{1}{2}$ m.

The Coast from Broken Point to Round Cape, in lat. $16^{\circ} 16' N.$, a little to the S. of the Buffalo Rocks, extends S. by W. and S.S.W., having some projections and indentations, with several islets and reefs, at the distance of from 1 to 3 m. in some places, the outermost of which are the following: a bank of rocky bottom, with 6 fathoms on it, in lat. $16^{\circ} 43' N.$, about $3\frac{1}{2}$ m. off shore, with depths of 15 and 14 fathoms near it, and 12 or 11 fathoms inside, between it and the main. **Mile-stone Rock**, above water, in lat. $16^{\circ} 40' N.$, 3 m. off shore, is in the stream of 15 fathoms, having several reefs 2 m. to the S., and a high isle nearly 3 m. S. by E. from the rock.

Coronge Island (the S. point) in lat. $16^{\circ} 31' N.$, is high, about 2 m. in length N. and S., contiguous to a rocky point of the coast, which forms a large bay to the N.E., having some rocks and islets in it, with soundings of 5 to 7 fathoms. **Nga-yot-koung** is a village in the bay to E. of Coronge Island. **Crawford Shoal**, in lat. $16^{\circ} 29' N.$, distant $3\frac{1}{2}$ m. W. $\frac{1}{2}$ N. from Conical Cape, and $3\frac{1}{2}$ m. S.W. from the S. end of Coronge Island, is partly dry at L. W. spring tides, having 16 fathoms close to it on the outside, and 12 or 11 fathoms about a mile inside; but Conical Cape must be avoided, as breakers and a white rock front it, at $\frac{3}{4}$ m. and $\frac{1}{2}$ m. distance.

LYCHUNE ISLANDS, in lat. $16^{\circ} 23' N.$, two in number, lie near each other, and $1\frac{1}{2}$ m. off shore, the innermost being called Oong-chune. Reefs and rocky islets extend 2 m. to the N. of them, and the adjacent coast is lined with rocks or reefs. The depths near the outer reefs and islands are 9 and 10 fathoms irregular, with 5, 6, and 7 fathoms in some of the passages between the islands or reefs.

Saingbain Kieu, or Buffalo Rocks, in lat. $16^{\circ} 19'$ to $16^{\circ} 22\frac{1}{2}' N.$, lon. $94^{\circ} 12' E.$, lie just to the S. of the Lychune Island, and bear nearly S. $\frac{1}{2}$ W. from the outermost Calventura Rocks, distant 10 or 11 leagues: they are a group of detached rugged rocks, extending nearly N. and S. about $3\frac{1}{2}$ m., situated $2\frac{1}{2}$ m. from the shore, and bearing N. from Cape Negrais. **Ngan-kyoung**, in lat. $16^{\circ} 20' N.$ (Naing-chune on the chart), is a village on a stream, abreast of these rocks. The N. Buffalo is a little more than $\frac{1}{2}$ m. to the S.W. of the outer Lychune Island; and about mid-way betwixt it and the S. Buffalo, Perforated and Pillar Rocks are situated. The soundings betwixt these rocks and the N. or S. Buffalo are from 9 to 12 fathoms, and nearly the same depths continue to the edge of the shoal-bank, about a mile inside the S. Buffalo, which shoal-bank extends along the coast about $1\frac{1}{2}$ m. off shore, having on it several dangers and rocks above water. In the present state of our knowledge, no vessel should go in-shore of these islets and rocks. At Round Cape, in lat. $16^{\circ} 15\frac{1}{2}' N.$, the coast is more safe to approach, and continues so to the Brother Hills, in lat. $16^{\circ} 8' N.$, excepting that a rock, called **Black Rock**, in lat. $16^{\circ} 11' N.$, lies above water $2\frac{1}{2}$ m. off shore, having 9 and 10 fathoms, water, close to it on the inside. On the W. side of the Buffalo Rocks the soundings are regular, 20 fathoms about a mile from them, and 50 or 60 fathoms at 5 leagues' distance: but they should not, without great caution, be approached in the night, nor should the coast between the Calventura Rocks and the Buffalo Rocks be borrowed on under 20 fathoms in most places, excepting during fine weather in the daytime.

CAPE NEGRAIS, in lat. $16^{\circ} 1\frac{1}{2}' N.$, lon. $94^{\circ} 13' E.$, is the S.W. land of the coast of Pegu, but the S. extremity of that coast is called **Thay-gin, or Pagoda Point**, in lat. $15^{\circ} 57' N.$, bearing nearly S.S.E. from the former, distant $6\frac{1}{2}$ m. Very near the point there is a large rock, with a small pagoda, and red cliffs stretch from it towards Cape Negrais, which are fronted by a reef, extending $1\frac{1}{2}$ m. to the W.; this reef terminates at the N. end of the red cliffs near Cape Negrais, and should not be approached under 10 fathoms in a large ship. To the N. of the red cliffs the shore is more bold, there being from 11 to 12 fathoms, soft ground, within 2 or 3 m. of the Cape;

but between the latter and the Brother Hills, straggling rocks or reefs project $1\frac{1}{2}$ m. from the shore, which should not be approached under 11 fathoms.

Bassein, or Negrais River, or Persaim River, formed between Pagoda Point to the W. and Point Porian to the S.E., is navigable a great way inland: there are two channels that lead into it, one on each side of Negrais Island, and the W. channel forms a good harbour betwixt that island and the W. side of the river. The E. channel was not so safe until its channel was buoyed; for an extensive reef projects from the land about Point Porian nearly to Diamond Island, and a reef projects also from Negrais Island about 5 m. to the S.W., which, with other detached shoal-banks, nearly join the extremity of the former reef and Diamond Island. This river was formerly a place of resort for trading-vessels from Coringah and other parts of the Coromandel coast; but since the Burmese War of 1852, it has attained an extensive European trade, and has a Master-Attendant. Rice is the principal export; teak-timber is next in importance.

Port Dalhousie, the entrance-port, about 8 m. to N.E. of Negrais Island, has proved itself a dangerous place in the S.W. monsoon, and Heckford's "Coasting Guide" advises ship-masters not to remain there longer than necessary, at the change of monsoons; nor to resort there, when outward-bound, unless ready to start at once.

Hingie, or Negrais Island, situated in the entrance of the river, $3\frac{1}{2}$ m. inside Pagoda Point, and nearest to the W. shore, is conspicuous by a hill on it, which is the E.-most *high* land on the coast; Point Porian, on the S.E. side of the river's mouth, being the first *low* land, formed of white cliffs, and covered with trees. The whole of the coast, from the extremity of the Aracan Mountains near Cheduba to Cape Negrais, is a continued ridge of craggy land, tolerably high, broken into cliffs of reddish earth in many places, and generally with low trees or brushwood upon it, without any signs of cultivation or inhabitants towards the sea.

A ship intending to anchor under Pagoda Point should bring it to bear N.E. $\frac{1}{2}$ N. or N.E. by N., then steer for it; some hard casts of 6, or perhaps 5 fathoms (towards H. W.), may be got on the *Orestes* Shoal, the tail of the sand that extends from Negrais Island, and when the point bears from N.W. to about W., about 1 m. off, she may anchor in 6 or $6\frac{1}{2}$ fathoms, mud. A ship going in for the harbour or channel between the island and W. shore should round Pagoda Point at the distance of a mile in 6 or $6\frac{1}{2}$ fathoms (H. W. depths), but a little inside the point the channel becomes more contracted. No vessel, drawing over 14 ft., should attempt to pass between Negrais Island and the main towards Port Dalhousie.

Diamond Island, or Lychune, in lat. $15^{\circ} 51\frac{1}{2}'$ N., lon. $94^{\circ} 18\frac{1}{2}'$ E., bears nearly S.S.E. from Pagoda Point, distant $5\frac{1}{2}$ m., and fronting the entrance of Negrais River; it is low, covered with trees, about 1 m. in extent, and may be seen about 5 leagues; but it should not be approached in a large vessel without great caution, on account of the reefs that surround it, particularly on its S. and W. sides. The leading mark for passing to the N. of Diamond Island, is to keep the extreme point of Cape Negrais a very little open with the bluff of Pagoda Point: this will take a vessel clear between the flat extending off Porian Island and Diamond Island, but buoys are now laid down to mark the channels, as follows:—

Fairway Buoy (*Red*, with "Fairway" on it,) is placed $1\frac{1}{2}$ m. to N.E. of Diamond Island.

A first-class *Red* Buoy marks the S. tip of Orestes Shoal, at 2 m. to N. of Diamond Island.

Another *Red* Buoy marks the E. edge of Orestes Shoal; and due E. from this, a *Black* Buoy marks the W. edge of Porian Shoal.

ALGUADA REEF bears from Diamond Island S.S.W. $3\frac{1}{2}$ leagues, the N. extremity of it being in lat. $15^{\circ} 48'$ N. It is a very dangerous reef of rocks, level with the surface of the sea, extending N. and S. about $1\frac{1}{2}$ m.; but there are detached rocks at a considerable distance from it, one with $3\frac{1}{2}$ fathoms, about 1 m. S. by W. from the light-house; therefore vessels ought not to stand in under 15 fathoms when rounding it; on some of which the sea breaks in bad weather. The passage between Diamond Island and Alguada Reef is very dangerous, and ought not to be adopted in any ship, except in a case of *great* necessity. Several ships have struck upon these sunken rocks, one which was H. M. S. *Exeter*; and the ship *Travers*, bound to Bengal, was totally lost on a rock *said* to bear N.N.E. from Alguada Reef, distant $\frac{1}{2}$ m. (Travers Shoal), probably the same on which the *Exeter* struck.

Light. Alguada Reef, in lat. $15^{\circ} 42\frac{1}{2}'$ N., lon. $94^{\circ} 14'$ E., has now a splendid light-house, showing a light *revolving* every minute, elevated 144 ft. above H. W. level, visible 18 m. off. Navigators must remember the $3\frac{1}{2}$ -fathoms shoal which lies nearly 2 m. to S. of the light. Be careful also how the tides set the vessel.

Directions. Since the erection of Alguada Reef Light-house, the entrance of this port has little danger. Vessels, coming from the S. and W., in the S.W. monsoon, should pass about 3 m. (and not less) to the S. of the light-house. When it bears N.N.W., steer about N.N.E. to pass

nearly 1 m. to E. of the S. point of Diamond Island, hauling up to the N. towards the Fairway Buoy (placed $1\frac{1}{2}$ m. to N.E. of that island). Passing close to the E. of this buoy, steer N.N.E. to pass between the *Red* and *Black* Buoys; when between them, steer N.E. by N. for the anchorage off Port Dalhousie.

Strangers in the S.W. monsoon had better anchor under the lee of Diamond Island, where good anchorage, in 5 fathoms at lowest tides, and smooth water may be had. This anchorage is safer than that off Port Dalhousie. In the N.E. monsoon, they may also anchor about $1\frac{1}{2}$ m. to N.N.W. of Diamond Island, and there wait for a pilot.

In the N.E. monsoon, vessels coming from the W. and the N., may steer for Diamond Island on a S.E. course. When the Fairway Buoy is seen, steer to pass between it and the *Red* Buoy* on the tail of Orestes Shoal. From mid-way between these buoys, steer N.E. by N. to pass between the *Red* and *Black* Buoys as before, and onwards to Port Dalhousie.

Phaeton Shoal, on which H. M. ship *Phaeton* struck in 1810, obliging her to go to Bengal for repair, bears S.W. by S. from Diamond Island, distant 4 m., and N. by E. $3\frac{1}{2}$ m. from Alguada Reef, having 9 fathoms, water, close-to, 12 ft. upon it, and is of small extent. Exclusive of these dangers, the bottom is chiefly uneven and rocky betwixt Diamond Island and Alguada Reef, with a heavy, turbulent swell, occasioned by the sea beating upon the reefs, and the strong tides, about 2 knots per hour.

Tides. Flood sets to the E. by S., and the Ebb to the W. by N. The rise of tide is about 9 to 12 ft. on the springs; H. W. about $10\frac{1}{2}$ h. on F. and C. of the moon, in the entrance of the river. From the heavy confused swell that generally prevails in this dangerous channel, even during calm weather, it is often called the Race of Negrais, and certainly should be avoided by ships: for by rounding the S. end of Alguada Reef, they are but a few miles farther out, in a safe and spacious channel, about 17 leagues wide, between it and the Island Prepara. When the sea is smooth in the N.E. monsoon, the breakers on Alguada Reef are not high.

At 4 or 5 m. distance from Alguada Reef, both to the E. and W., the depths are generally from 15 to 18 fathoms, blue mud, and to the S. of it at the same distance, 19 and 20 fathoms. It is prudent not to approach Alguada Reef nearer than 1 league on any side. About 4 or 5 leagues to the W., the bank shelves suddenly to no ground, but soundings extend from Alguada Reef to Prepara, and the depths increase to 40 and 50 fathoms in the track between them; near to Prepara Island they are irregular in some places, but on the E. side of the island decrease to 8 fathoms within less than a mile of the shore, where there is a pool of fresh water. H. M. S. *Thalia* found a shoal with 12 and 26 fathoms, amongst soundings of 45 fathoms, bearing about S.W., and 36 m. from Alguada Reef.

Ships bound to Bengal in the N.E. monsoon should not keep within sight of the coasts of Pegu and Aracan, which was formerly considered indispensable to secure the passage; but experience shows, that Northerly or light winds prevail greatly on these coasts, and the current sets often to the S., rendering the progress at times very slow; it therefore happens, that ships which keep out in the open sea, at a reasonable distance from the land, generally make the best passages up the bay in this monsoon. Ships which sail indifferently, or being short of water, if they intend to adopt the passage along the coasts of Pegu and Aracan, ought to keep well in with the shore, where it is safe to approach, that they may benefit by the breezes from the land, when these are found to prevail; and also to preserve moderate depths for anchoring, when it falls calm, with the current unfavourable. Severe storms are liable to happen at the setting in of the N.E. monsoon, and at times in the S.W. monsoon. In Nov. the ship *Minerva* had a hurricane from the E., off Cheduba, which blew away all her sails, carried away the topmasts, and obliged them to cut away some of the boats. Many other ships have been dismasted, or suffered damage, in Oct. or Nov., near the coasts of Aracan or Pegu.

Prepara Island, the N. point, is in lat. $14^{\circ} 55' N.$, lon. $93^{\circ} 37' E.$;† but the two islets, Cow and Calf, are $1\frac{1}{2}$ m. off to N. by E., and the S. extreme of the dangerous shoal water, lying off it, bears S.S.W., and is 12 m. from the above position. (See also Prepara at page 518).

Thalia Bank (called *Thalia Reef* on the charts) is a shoal with 12 fathoms, least water, lying 21 m. to N. by E. of Prepara, and 37 m. to S.W. by S. of the Alguada Reef Light.

The Coast of Pegu extends from Negrais River about 60 m. E.S.E. to the Baragu Flats; thence about N.E. by E. for 120 m. to the head of the Gulf of Martaban, and is generally low and woody, intersected by the many branches of the Irrawaddy and other rivers, with reefs and shoal

* This *Red* Buoy was missing in the year 1871; strangers should (in such case) be careful not to mistake the other *Red* Orestes Buoy for this one, or they might bump in 8 fathoms on the tail of Orestes Shoal.

† A meridian distance from Port Blair, and another from Penang, give this longitude, nearly; but on one of the Admiralty charts Prepara is placed 6 m. farther E.

water extending along it to a considerable distance; it is, therefore, a dangerous coast in the S.W. monsoon, for the tides set strong, and a ship might run aground in some places before the land could be perceived. From Porian Point, a bank extends off about $2\frac{1}{2}$ m., and continues in an E.S.E. direction, 52 or 53 m., from whence it runs in an E. direction, and gradually trending to E.N.E., then to N.E. on towards Rangoon. The S. extreme of the Baragu Flat is in lat. $15^{\circ} 29' N.$, lon. $95^{\circ} 12' E.$, from whence the land is seldom visible, except in very clear weather and from the mast-head.

The **IRRAWADY RIVER** derives its source from the snowy range of the E. Himalayas; and starting from the S. side of the range through which (a little farther W.) the Great Bramaputra cuts its course, this river takes a general S. direction, passing **Ava**, the capital of the Burmese kingdom, in lat. $21^{\circ} 52' N.$, lon. $96^{\circ} E.$; thence it turns to W. and to S.W. for more than 100 m., then about S. by E. to **Prome**, which British town is 220 m. below Ava. Below Prome it passes **Henzadah** (a little to N. of which town the Bassein branch turns off), and **Donabew**; below which place the Delta *proper* commences, the E. branch running to Rangoon about 150 m. below Prome; the next W. branch is the **Tob**, or **Tou-Khwa River**, called **China Buckeer** near the sea; the others flow past the islands, **Pyah-pong**, **Engtay**, **Shuayloun**, **Myoung-mya** and **Thek-ay-toung**, which last forms the lower E. side of the Bassein River. The mouth of the Irrawady is between **Shuayloun** and **Engtay**, in about lat. $15^{\circ} 46' N.$, lon. $95^{\circ} 10' E.$, and to the S.E. of this lies the Baragu Flat.

DIRECTIONS for approaching Rangoon. A vessel was formerly advised to pass to the N. of **Diamond Island**, bound to the E. with a fair wind, and to keep the large **Pagoda** on with the N. end of **Diamond Island**, until she deepened to $10\frac{1}{2}$ or 11 fathoms. This was thought advisable to save time, as during Nov., Dec., and Jan., there is little or no flood-tide felt to the S. of the **Alguada Reef**, except at spring-tides. But now it is better to go outside of the **Alguada Light-house**, rounding it about 3 m. off, in not less than 15 fathoms. A vessel may then stand to the E., to get into 10 fathoms as before, and then E.S.E., keeping in a line of 9 or 10 fathoms, altering her course so as to keep in this depth until abreast the S. extreme of **Baragu Flat**. Then, to keep in this water, she will steer an E. course, on which line she will (when to the E. of **Baragu Point**) deepen her water to 12 and 15 fathoms, and sight the **Krishna Light**. She may then, if bound to Rangoon, stand to the N.E., taking care not to come under 10 fathoms until to the N. of **Krishna Shoal**.

If bound to **Moulmein**, she ought to steer E. by N. or E.N.E. (according to the time of tide), when she will again shoal her water to 10 and 9 fathoms, which depth is the best line to keep in until sighting the **Double Island Light** off the E. coast; but during the S.W. monsoon, it is advisable to keep more to the S., in 14 or 15 fathoms, making the land near to **Calegouk Island**.

Light.—**Krishna Light-house**, erected on screw-piles, in lat. $15^{\circ} 36\frac{1}{4}' N.$, lon. $95^{\circ} 35' E.$, shows a *fixed* light, 60 ft. above sea, and visible 14 m. off: it is on the S. by E. verge of the shoalest water of **Krishna Shoal**, which extends from lat. $15^{\circ} 36' N.$ in a N.E. direction for nearly 15 m., to lat. $15^{\circ} 47' N.$, and is a bank of hard sand, situated to E.S.E. of **Baragu Point**, distant from the nearest shore 10 m. It is a narrow ridge, about 1 m. wide, with a channel between it and the shore, with $3\frac{1}{2}$ and 3 fathoms in it, the bottom soft mud.

When to the N.E. of the **Krishna Shoal**, a small vessel ought not to come under 5 fathoms until in lat. $16^{\circ} 5' N.$; she will then be to S. of **China Buckeer Point**, to the N.E. of which stands a new light-house, with the lower part *white*, near some **Palmyra trees**, the tops of which are seen a little above a long belt of even jungle. Farther to N.E. there are two very tall **Palmyra trees** on **Elephant Point**, near to the **Pagoda**, which are the first objects seen near to the Rangoon river's entrance. On the E. side of the entrance, the trees grow thicker together, and are called the **Eastern Grove**; here another new light-house has been erected.

The soundings to the S. of **Alguada Reef**, when near the reef, are very uneven, coarse sand and mud alternately, until 8 or 10 m. to the S.S.W., when they become more regular, with coarse sand, shells, and rotten coral, which bottom continues the same nearly on to **Preparis Island**. This bottom was a good guide for vessels during the S.W. monsoon, before the erection of **Alguada Light-house**, when it was not advisable for vessels to approach **Alguada Reef**. To the E.S.E., beyond the range of the *revolving* light, the bottom is all mud, and continues on to the **Tenasserim coast**. Vessels proceeding to the E. with a working wind, should be guided by the **lead**, which ought to be kept going when approaching the **Baragu Shoal Flat**, and they ought not to stand under 7 fathoms, from which the soundings decrease quickly to 3 fathoms.

Tides. Tides on the coast of **Pegu** are very irregular during the N.E. monsoon, when there is scarcely any perceptible flood during the neaps off the **Baragu Flat**, and during the springs not running more than three hours, at the rate of 1 to $1\frac{1}{2}$ m. per hour; when to the N.E. of **Baragu Point** the tides become stronger—on the springs running 3 and 4 knots, and during the neaps 2 to $2\frac{1}{2}$ knots. The rise and fall of tide at **Alguada Reef** is about 12 ft.; H. W. on F. and C. at

10 h. 45 m. Off Baragu Flat the rise is only 7 ft., and H. W. at 11 h. A little to the N. of the Krishna Shoal the rise is 12 ft. To the E. of Rangoon River the tides run very strong during the springs, greatest velocity being upwards of 7 knots, and the rise and fall from 25 to 27 ft.

Vessels from Amherst bound to Rangoon ought to endeavour to keep in a line of 5½ or 6 fathoms (L. W. depths) until they sight the China Buckeer Light-house (because the E. Grove Light is screened on the E. side, till it is to the E. of a N. bearing), and then stand to the N. as directed.

LIGHTS.—China Buckeer Light-house, in lat. 16° 19½' N., lon. 96° 12' E., stands at the coast-line to N.E. of the river, and 55 m. to the N.E. of Krishna Light. Its light is *revolving*, showing its brilliancy every minute, and visible at 15 m. from the deck, but at 20 m. from the mast-head, its elevation appears to be only 74 ft. The lower part of the Light-house is white.

The E. Grove Light-house, in lat. 16° 29' N., lon. 96° 28½' E., stands on the E. side of Rangoon River entrance, about a league to E.N.E. of Elephant Pagoda. Being only intended for vessels entering the river, the light is entirely obscured on its E. side. The light is *fixed*, at 93 ft. above H. W. level, and visible 12 to 14 m. off.

The Approach to Rangoon River. Steer so as to make China Buckeer Light between the bearings of N. by E. and W.N.W.; and when the E. Grove Light bears N.N.E. ¼ E., the China Buckeer may be brought to bear W. by N., which position is on the pilot station, in about 4 fathoms, mud (L. W. depth). Vessels should anchor till daylight, or till a pilot is obtained.

If the weather forbids anchoring, a vessel should work to the S., keeping the E. Grove Light between N.N.E. ¼ E. and N., and not bringing the China Buckeer *revolving* light to the W. of a W.N.W. bearing. If unable to keep off the pilot station, owing to a strong flood-tide, and compelled for safety to run in rather than anchor, even a stranger (with Ward's chart) may do so, running for the E. Grove Light, N.N.E. ¼ E., passing the *red* buoys on your *port* side, and the *black* buoys on your starboard side. Above the upper *red* buoy, you must haul to the N.W., to pass close to the N. of Elephant Point, and anchor under its lee in 6 or 7 fathoms.

Passing up the River. The depths will be from 4 to 7 fathoms, keeping close to the W. shore, for nearly 3 leagues to Bassein Creek, off which is Lumps Shoal of 14 and 15 ft. at L. W., with a narrow channel to the E. of it, with 3 to 6 fathoms, about ¼ m. in width; borrow on the E. shore *within* ¼ m., having from 4 to 14 fathoms; avoiding a shoal in the centre of the river, about 2 m. above Bassein Creek, with 6 to 12 ft. on it about 7 m. on a N.N.W. and N. by W. direction, you will be near the Hastings Bar, with 7 to 9 ft. on it at L. W.: it is about a mile broad; there are *red* and *black* buoys, which mark the passage. From the bar of 7 ft. to Rangoon city, the distance is about 1½ m. W. by N. to the anchorage off Rangoon in 3½ to 7 fathoms.

Tides. It is H. W. on F. and C. of moon in the river entrance, at 3 h. 15 m.; rise at springs, 21 ft.; at neaps, 14 ft. Off Rangoon Town, it is H. W. on F. and C. at 5 h. 30 m.; rise of tide then, and for two days afterwards, from 25 to 20 ft., and 14 or 15 ft. at neaps; the velocity of stream is from 4 to 5 knots per hour.

RANGOON RIVER is called also Sirian and Pegu River; on the bar there is 8 fathoms at L. W. spring-tides, and some parts dry are visible on the steep banks on both sides of the channel. The Fairway is marked by buoys; two *red* on the W. side, and two *black* on the E. side, and with the ebb-tide, the inner *red* buoy should be kept close aboard. On the E. side of the entrance the trees grow thicker together, and are called the Eastern Grove; here the new light-house has been erected on screw-piles.

Rangoon Town is situated on the N. shore of its river, whence the reach extends to the W. about a league, and then the river takes a N. direction as before. The Town, distant about 8 leagues to the N. of the bar, is at the angle where the Pegu River turns off to the N.E.; it is a place of considerable trade; being now a British port, the new town will rival the former in wealth and importance. The productions of the country are teak, rice, wheat, cotton, indigo, sugar, cutch, lac, &c.; silver, copper and rubies are found in abundance in the countries near the head of the Irrawaddy River, all of which find an outlet by Rangoon. Rangoon is a fine navigable river; and the entrance more easily recognised, since the excellent light-houses were erected. Early in 1862 an electric cable was laid betwixt Singapore and Rangoon, and the land telegraph goes to Chittagong and Calcutta. The country abounds with straight teak-timber, some of which is exported to Calcutta and other parts of India for ship-building; and there are many ships of various dimensions built at Rangoon, although the crooked timber here is not so durable, and far inferior to that used on the Malabar coast for ship-building. Poultry, hogs, fruit and vegetables, and other articles of refreshment, may be procured in abundance and at reasonable prices. Wood-oil, petroleum, wax, dammer, and other articles, are exported from hence. Dagon Pagoda is about 1½ m. to the N.N.W. of Rangoon Town, elevated 487 ft. above H. W. level, in lat. 16° 47' N., lon. 96° 12' E.

The GULF of MARTABAN, between the Krishna Light-house and Double Island Light-

house (off Moulmein), is 115 m. broad, with shoal soundings throughout; the line of 10 fathoms, running almost straight between the two above lights, and all to N. of that becoming gradually shoaler. During the springs in the S.W. monsoon, it at times blows very strong, when great care should be taken not to get to the E. (in cloudy weather) of the Middle Ground (or shoal ground which lies off the land, separating the Rangoon and Sittang Rivers), between which and the Zingaat Mountains, or Martaban shore, the sands extend a long way to sea-ward, over which the Bore rushes with the flood, which makes it very dangerous when near them. As a general remark, applicable to the whole coast from Amherst to Point Porian, when the position of a ship is not known, and you get into hard soundings, you should haul to the S. to get into soft sounding. While in soft sounding, with good anchor and cable judiciously used, a ship will seldom drive on the flood-tide unless it blows a gale of wind, which is seldom known on this coast.

Sittang River, about 15 leagues E. from Rangoon Bar, is the E. and principal branch of Pegu River; it is shoal, but wider than the other, generally called Rangoon River, and it forms a natural division between the low coasts of Pegu and the high land, called Zingaat Mountains, or Martaban Hills, by falling into the bottom of the Gulf of Martaban. The entrance is about in lat. $16^{\circ} 26' N.$, lon. $97^{\circ} 17' E.$ **Shoay-gheen**, about 60 m. from the sea, is the chief town of the district of that name (formerly called Martaban), but the river is not surveyed, and little known. Off the town of Sittang, or about half-way to Shoay-gheen, a high and dangerous Bore occurs at spring-tides, similar to that of the Hoogly.

Pegu Town, in lat. $17^{\circ} 20' N.$, lon. $96^{\circ} 28' E.$, is about 60 m. by river to N.N.E. of Rangoon, and was formerly the capital of the province, but the latter place is developing into a large city, and absorbing the trade of contiguous towns. Pegu has water communication with Moulmein on the E., and with Bassein to the W., and Prome and Ava to the N.

Tides on the Coast of Pegu generally run very strong; the flood sets E. and E. by N., and the ebb in the contrary direction, to the W. of Baragu Point; but from that point to Rangoon Bar the flood sets N.E. and N.E. by N., and the ebb to the S.W.; farther E., between Rangoon River and the coast of Martaban, the flood runs N.N.E. and N. by E., strong into the bottom of the gulf, and the ebb equally strong out of it, in the opposite direction, at 6 knots per hour. When the rivers are swelled, and the low country inundated by the rains at the end of the S.W. monsoon, the ebb-tides are much stronger and run longer than the flood-tides, occasioned by freshes from the rivers; the water then is very thick and muddy at a considerable distance from the land, which is more or less the case on this coast at all times, opposite to the numerous rivers that disembogue into the sea. Abreast of Baragu Point, and farther to W., the velocity of the tides is not nearly so great as off Rangoon River and in the bottom of the gulf; for here it is frequently in the springs 4 and 5 m. an hour, and sometimes more near the edges of the shoal-banks. After the rains, the tides off Rangoon River are subject to a circular motion: the first of the flood sets E., changing gradually to N.E. about half-flood, and to N. in the latter part. The ebb sets just the reverse: beginning to run W., it changes gradually to S.W. and S., ending at S.E.; but there is no slack water at these times, the tides continuing to run $1\frac{1}{2}$ or 2 knots when changing from the flood to the ebb, and the same at the opposite change. On the W. part of the Pegu coast, off Porian Reef, the rise and fall of the tide is only 9 or 10 ft. on the springs; but off Rangoon Bar it is frequently 19 or 20 ft., and from 21 to 24 ft. farther to the E., in the bottom of the gulf near the banks at the entrance of Sittang River; caution is therefore proper in making free with this part of the coast, and it is necessary to acquire a knowledge of the tides in order to prevent the mistake, of anchoring near H. W. in a situation where a ship would be aground at L. W.

PASSAGES TO AND FROM RANGOON.—Ships bound to Rangoon from Bengal in the N.E. monsoon should make Cape Negrais, and pass round to the S. of Alguada Reef; those which come from Madras or other parts of the Coromandel coast in the same season, after beating across the bay, may pass through the channel between Alguada Reef and Prepara, or between the latter and Cocos Islands, as may be most convenient. In this season, from Oct. to Feb., it is prudent, after passing Alguada Reef, to steer to the E. for Baragu Point, endeavouring to keep in with the coast; for at times there is very little flood, the freshes from the rivers frequently producing a constant current setting to the S.W. and round to N.W. If you fall in with the land to the W. of Baragu Point, the water will shoal quickly from 20 to 16 and 10 fathoms towards the edge of the reef; and in a large ship it would be imprudent to borrow under 9 or 10 fathoms, for in some places the edge of the reef takes a S.E. direction, and is steep from 6 to 3 fathoms, when the low land is hardly discernible. Soundings extend a great way out from this coast, there being 43 and 44 fathoms about 24 leagues S. from Baragu Point, in lat. $14^{\circ} 30' N.$; and from thence soundings continue on the same parallel to the coast of Martaban. If the wind be far E., rendering it

necessary to tack at times, the coast may be approached to 7 fathoms, or nearer occasionally, when to the E. of Baragu Point and Dalla River; the soundings over a soft bottom being then more regular, and the banks not so steep as they are to the W. On sighting the Krishna Light, the position will be known by the soundings on any bearing of the light. But as the Krishna Light does not show till bearing to the N. of E.N.E., navigators must be careful to remember the time of tide, and not get (towards H. W. time) into the channel between the Krishna Shoal and the main, whence the light is not visible.

Ships bound to Rangoon from Malacca Strait, Acheen, or the Nicobar Islands, in the N.E. monsoon, should endeavour to pass in sight of the W. islands of the Mergui Archipelago, and from thence to the N. in a direct line for the entrance of Rangoon River. In proceeding to cross the bar, it ought not to be attempted before half-flood, for the first of the flood sets strong to the E. upon the Middle Ground Shoal, situated on the E. side of the channel, which, close-to, has deep water, and irregular soundings. The tide set fair into the river after half-flood, and that is the most favourable time to cross the bar.

If bound to Rangoon from Bengal in the S.W. monsoon, a ship should endeavour to make the light on Table Island to the N. of the Great Coco, if the wind admit; or the Alguada Reef Light; and after passing through either channel as most eligible, a course ought to be steered to fall in with the Krishna Shoal Light. A ship from Madras, or any other part of the Coromandel coast in the same season, ought to make Landfall Island at the N. end of the Great Andaman, if the wind be far S., or the Cocos Islands, if it be at W., then pass to the N. of the Cocos Light, and take a good departure from it, and then to the N.E. by E. for the Krishna Light. If by accident she get to the E. of the bar a few leagues, Martaban Hills will be seen if the weather is clear; and in such case she must work to the W. with the ebb-tide.

Ships bound to Rangoon, from the Nicobars, Acheen, or Malacca Strait, in the S.W. monsoon, ought to make the Island Narcondam, and from thence steer for the Krishna Light about N.E. by N. All ships approaching the coast of Pegu in this season ought to be well provided with ground tackle, for the weather is sometimes dark and squally, preventing the lights from being seen, and it would generally be imprudent to borrow under 7 fathoms, until some light is discerned and the situation known. Ships are therefore necessitated at times to ride at anchor during strong gales on the springs when the tides are very rapid: this ought to be done in 7 or 8 fathoms, water, at least, and not in shoal water near the banks which bound the coast.

Departing from Rangoon River in the N.E. monsoon, ships bound to Bengal should steer, when clear of the bar, to pass 5 m. outside the Krishna Light, then skirt the Baragu Flat in not less than 7 fathoms, then to the S. of Alguada Reef, about a W. by N. course; afterwards, they may keep at a reasonable distance from the coasts of Pegu and Aracan, in proceeding toward the River Hoogly. Those bound to Madras, or other parts of the Coromandel coast, may at discretion pass through any of the channels between Alguada Reef and Landfall Island at the N. end of the Great Andaman, and then steer direct for their port, observing to fall in to the N. of Madras before Feb., and afterwards to the S. Ships in the same season bound to Malacca Strait ought to make the S. end of Junkseylon. If bound to Acheen or the Nicobar Islands, a direct course may be pursued to the place of destination.

Departing from Rangoon River in the S.W. monsoon, it is proper to work to the W. along the coast as far as Krishna Light, before a ship stand out into the open sea, whether she be bound for Bengal, the Coromandel coast, Acheen, or Malacca Strait. When China Buckeer Light is brought to bear W.N.W., longer tacks to sea-ward may be made at discretion, but it is advisable to keep near the coast, anchoring occasionally and taking advantage of the tides, which run very strong. Should it be night before a ship is past China Buckeer, she ought with the ebb to be permitted to drift to windward (with sails lifting), and the lead carefully attended to, that her situation may be known. The approach towards the shore will be shown by the lead, the soundings being regular, but do not go under 7 fathoms (L. W. depth), till Krishna Light is sighted, and you should pass fully 5 m. to the S. of it; the soundings will be sand and shells, in 7 or 8 fathoms, off Baragu Point. From this point, ships which sail well, if bound to Bengal, may continue to work to the W., and pass between the Cocos and Preparis Island, or even within the range of the Alguada Light; and from thence, if the wind keep between S.W. and S.S.W., they will probably reach Balasore Road without tacking; otherwise, they must endeavour to get to the W., by taking every advantage to tack with the favourable shifts.

Ships bound to Madras will find it tedious and difficult to beat across the bay from the coast of Pegu during the S.W. monsoon, and those that sail indifferently will find it impracticable; it therefore seems advisable for them to pursue the same route as if bound to Acheen. After working one or two tides to the W. of Baragu Point, a ship bound to Madras, or Ceylon, or intermediate

ports, or to Acheen, or Malacca Strait, may stand out to sea if the wind is well to the W., and endeavour to pass near the Island Narcondam; in proceeding to the S., care is requisite to tack occasionally and keep well to the W. of the Mergui Archipelago of islands, which form a lee-shore, although between several of them there are safe channels. If bound to Malacca Strait, after rounding the S. end of Junkseylon, a direct course may be steered for Penang Island, but a ship bound for Acheen ought to keep well to the W., towards the Nicobar Islands, if that can be conveniently done; otherwise, she may stand close upon a wind to the S. and make the coast of Pedir (N. coast of Sumatra), where a favourable current will be found setting to the W., which will soon carry her to Acheen. At this place she ought to fill up her water, if bound to the Coromandel coast or to Ceylon, then proceed through the Bengal passage, close round the N. end of Pulo Brasse, to sea, as circumstances render convenient. When out in the open sea, every advantage should be taken to get to the S.W., and an indifferent-sailing ship will probably have to proceed 4 or 5 degrees S. of the Equator before she can obtain Westing sufficient to reach her port with safety. Ships that sail well upon a wind may make a more direct passage from Acheen to the Coromandel coast, which has sometimes been accomplished in less than a fortnight, during the strength of the S.W. monsoon, although a longer time may be required. The ship *Ernaad*, Captain Corstorphine, left Rangoon River July 3rd, passed Acheen on the 25th, and round the N. end of Pulo Brasse on the same evening, and on the 5th of Aug. arrived at Madras; having only made a few short tacks in crossing the bay, when the wind drew to the W. three or four times.

COASTS OF MARTABAN AND TAVOY.

The **Zingaast Mountains, or Martaban Hills**, occupy the tract of land to N. of Pelew-Gewen Island, which is comprehended between the Sittang and Martaban Rivers. They are useful as land-marks to vessels coming from Bengal; after passing Krishna Shoal Light-house, ships may make the land about Double Island; the Table Land and Peak to the E. of Amherst being very remarkable and visible 10 or 15 leagues, and together with the high land of Martaban to the N.E., will be found excellent guides in closing the land. The parallel of 16° N. should not be crossed until within 5 m. of the coast, as the tides there are at the strongest, and the dangers off Pelu-Gewen Island and the river flats are very great. Double Island is not easily distinguished until well in with the shore; it is about 100 ft. high, thickly wooded, resembling an immense bush, and the light-house (140 ft. above sea) is at its N. end.

Pelu-Gewen Island, formerly called Bruxe or Buga, occupies a position to sea-ward of Maulmain and Martaban, thus forming two entrances to the Salween River. It is moderately elevated, and said to be very fertile: 17 m. long and 8 m. broad, extending from lat. $16^{\circ} 14'$ to $16^{\circ} 30'$ N. Pelu-Gewen is fronted to sea-ward by shoal-banks, which prevent the navigation of the passage N. of the island, leading to the Martaban River; the only available channel being that which runs due N. and S., between the E. shore of the island and the main, and which, from its leading to the town of Maulmain, is called the Maulmain River. The entrance to this river is $7\frac{1}{2}$ m. S. of the island, being formed on the N.W. by an extensive sand-bank called the Godwin Sand, which projects from the S. point of the island, and by reefs of Cape Kyai-kami to the S.E. The Godwin dries in some parts at L. W. spring tides. The distance from the bar to the town of Martaban is about $8\frac{1}{2}$ or 9 leagues, nearly N., but the depths in the channel are not more than $1\frac{1}{2}$, 2, or 3 fathoms in several places, and the river contains many banks and dangers, which render the navigation intricate. Pilots are therefore necessary to lead the ship into and up the river.

MAULMAIN and MARTABAN RIVERS are one, although the former name should be restricted to the channel inside Pelu-Gewen Island, which leads also to the latter. Amherst Town has been built on a peninsula (to which the same name has been given), which forms the S. side of the mouth of Maulmain River. **Cape Kyai-kami, or Quekmi**, upon which stands the pagoda of Quekmi and the town of Amherst, bounds the entrance of the Maulmain River on the E. side, and lies in lat. $16^{\circ} 5' N.$, lon. $97^{\circ} 35' E.$ The small *fixed* light formerly shown on the point, has been extinguished since 1869, when Double Island Light was shown; but there is a signal-staff near the pagoda. The land being low, is not seen above 12 m. from the deck, but the mountain about 5 m. to the S.E. of the point is visible 9 or 10 leagues off. A reef extends from the point in a N.W. direction about 2 m., rendering great caution necessary, for there is no good land-mark on the W. side of the channel to guide a ship in entering between the reef and the Godwin Sand. The channel of the river between the flats of the Godwin and the reefs of Kyai-kami is not more than $\frac{1}{2}$ m. wide at its entrance, to mark which there are now two buoys, that on the N. being *Red*, and that on the S., called the Reef Buoy, *Black*. There is also a Fair-way Buoy (*Black*) just outside of the Outer Reef, a $4\frac{1}{2}$ -fathom patch, $1\frac{1}{2}$ m. S.W. of the Reef Buoy. Within the entrance, about $1\frac{1}{2}$ m.

E. $\frac{1}{2}$ N. from the Reef Buoy, are two buoys on the Ann Rock, the N. one *Black*, the S. one *Red*. The anchorage called Amherst Road varies from 5 to 9 fathoms. The Amherst Banks are subject to very frequent changes; and no ship should enter the river without a pilot, for although the channels are buoyed, the *forms* of the banks frequently change, and the tides are strong and irregular. On entering the river the *Black* buoys should be left on the starboard hand; the Outer Reef Buoy is *Black*, with a flat top and staff, and when inside the *Red* buoy, the water pagoda will be open to the right of the large pagoda on the hill, which is the leading mark to the anchorage.

Maulmain, or **Moulmein Town**, is situated about 8 leagues up the river on its E. side, and fronting the town of **Martaban**, which stands on the opposite point. The forests of teak-timber in the neighbourhood are very valuable, and ship-building is carried on to a considerable extent. Maulmain is 24 m. to the N. of Amherst; and is a port and place of trade second only to Calcutta, Bombay and Madras, with a population of 50,000 of all classes. Moorings are laid down off the town, and as many as twenty vessels are found loading timber and rice, with many new vessels building, some of 1,000 tons; and its prosperity is annually increasing.

Approaching Maulmain River in the S.W. monsoon, which is the stormy season, commencing in May and terminating in Oct. (the rest of the year being made up by N.E. winds, calms, and clear settled weather), there is good anchorage on the coast at from 5 to 10 m. off, and excellent shelter in Bentinck Sound, behind Kalegouk Island, at 12 m. to the S. of the port; and, although the S.W. monsoon will test the goodness of the ground tackle, there is no swell to prevent a ship from anchoring generally off Green Island.

Pilots are kept at Amherst. There are two classes, European and Native, both skilful and sober; the Station is at the entrance of the river, which is easily known by the flag-staff and building on the point; but the best anchoring-ground to wait for a pilot is in 8 or 9 fathoms (L. W. depth) with the S. point of Green Island from E. to E.N.E. about 2 m. distant; and do not go to the N. of this without a pilot. The following rates of pilotage are established up and down the river; but if towed by a steam-vessel, three-fourths of these rates only are charged:—

8 ft. ...	25 rupees.	13 ft. ...	60 rupees.	18 ft. ...	200 rupees.
9 „ ...	30 „	14 „ ...	70 „	19 „ ...	240 „
10 „ ...	35 „	15 „ ...	80 „	20 „ ...	300 „
11 „ ...	40 „	16 „ ...	90 „	and an additional 50 rupees per foot above 20 ft.	
12 „ ...	50 „	17 „ ...	100 „		

There is no want of water in the channels. Ships drawing 22 ft. can go down during the springs at any time of the year; yet the channels are narrow and tortuous, but a tug-steamer is plying on the river.

In the N.E. monsoon, it is advisable to approach the entrance of this river in lat. 16° N., and when on this parallel, in lon. 97° E., the Zingaat Mountains will be discernible in favourable weather. The soundings and the latest charts will indicate a ship's position in crossing the Gulf of Martaban, and she need not go under 7 fathoms.

A ship sailing from Amherst in the S.W. monsoon, before obtaining an offing, may probably be obliged to anchor two or three times during the flood-tide, with the risk of riding very hard, or parting her cable by the heavy sea. The ship *Ernaad*, Captain Corstorphine, left Maulmain River June 22nd, bound to Madras, with squally and rainy weather for two days, and was obliged to make several tacks to the W. to obtain an offing, before she could stretch to the S. Again, the *Ernaad* left Madras June 3rd, for this river: on the 7th passed through the channel between the Cocos and Andaman Isles; arrived off the entrance of Maulmain River on the 12th, and got a pilot on that day; but squally, unsettled, rainy weather, light airs and calms, rendered it unsafe for her to run for the harbour against the strong tides which ran out, and to cross the entrance; she was, therefore, obliged to remain at anchor outside till the 14th, and on that day got into the river.

It is proper to approach the land between **Double Island**, in lat. $15^{\circ} 53'$ N., lon. $97^{\circ} 36'$ E., on which a light has been erected, and **Green Islet**, in lat. $16^{\circ} 3'$ N., which is about $1\frac{1}{2}$ m. to the S. of the Pagoda, as without this precaution, the strong tides may sweep a ship past the buoy that is placed at the point of the reef, and carry her on the Godwin Sand. When $1\frac{1}{2}$ or 2 m. to the W. of Green Islet, she should anchor, to wait for a row-boat and pilot, with the pagoda on Amherst Point showing to the N. of the islet; thereby enabling pilots to come off during a flood-tide, by pulling along shore to the S., and also giving plenty of room to weigh, a matter of some difficulty, and danger in the strong tides off the rocks and shoals. A pilot station is on the little island. If the wind be from the S. or W., the time to weigh is H. W., or just at the commencement of the ebb; but if at N. or N.E., the last quarter flood is the proper time to weigh, in order to have a

weak tide under lee. The extremity of the reef being very near the Outer Buoy, no ship must pass to the E. of the latter. The anchorage at Amherst will admit several ships, but must be avoided by large vessels in the S.W. monsoon, being open to all winds from S.S.W. to W. and N.W., when a considerable swell rolls in through the gaps of the reef.

Supplies. Beef and pork are very cheap; poultry of all kinds rather dear for India, but less than half the price in England; vegetables and fruit abundant at reasonable prices. Marine stores may be stated at 25 to 30 per cent. on invoice cost, and the market is generally well supplied. The disbursements of a ship of 500 tons will, under ordinary circumstances, not exceed £250, particularly if a ship is properly fitted out with stores before she leaves England. All repairs above water can be executed at Maulmain well and cheap; there are no graving-docks, but several master carpenters, Englishmen, who are capable of undertaking heavy repairs, reside here. The shippers send the timber alongside at their own cost and risk to a chartered ship; but when a ship purchases a cargo, the delivery, unless specially stipulated, takes place on shore. Loading ships moor with two anchors within a cable's length of the shore, the nearer the better; there is less tide in-shore, and in case of a log of timber getting adrift, it is easier picked up again. The contract price for hoisting in and stowing the timber is one rupee a ton; about 500 tons stowed away in a month is considered good work. The forests of teak are 200 m. and upwards from Maulmain.

The salt water worm (*teredo navalis*) is very destructive here. Maulmain River seems to be their chosen home; any timber, even when payed with several coats of tar or blacking, forms no protection from them; in six weeks they form a lodgment in a ship's bottom or bends; there is no preventive but copper or metal sheathing, and it is strongly recommended to all ships bound to Maulmain to have an extra streak or two of copper put on; but if once they have perforated the bends, they can only be destroyed by lightening the ship to the copper, and exposing the sides to the sun, when the heat and want of water effectually destroy them. The climate of Maulmain is healthy for the tropics; March, April and May are hot months; the rest of the year is cool, and not much warmer than a summer's day in England. Seamen suffer much from dysentery, and disorders of the bowels, fevers, &c., ascribed to drinking the river water, which is seldom fresh at Maulmain; but there are plenty of wells on shore: the best plan is to send a boat up the river, say to the distance of one tide, where the water is fresh and good.

Tides. The tides in the Maulmain River are strong, their velocity being about 5 m. per hour on the springs, and 3 m. during the neaps: H. W. at 2 h. 20 m. at the point of the reefs, at F. and C. of moon, and at 2 h. at Amherst; and the rise of tide from 20 to 22, neaps 12 ft.

The Coast. From Cape Kyai-kami to the S., the coast may be approached within 2½ or 3 leagues, but not under 5 or 6 m. in some places; for by the survey of Captain Ross, patches of rocks are interspersed at the distance of 3 and 4 m. from the shore, to the S. of Double Island, which is distant 4½ m. from the land, having 6 and 7 fathoms inside, and 8 fathoms near it on the outside. The coast is low fronting the sea, and forms a bay occupied by a shoal-flat. The flood a little outside, in 9 fathoms, water, has a velocity of 4 m. per hour on spring-tides, and augments in strength as Cape Kyai-kami is approached.

Light. Double Island, in lat. 15° 52½' N., lon. 97° 36' E., has a light-house, exhibiting a fixed light of the first-class, at 134 ft. above H. W. level, and visible 19 m. off. This light does not show on the land-ward side; and the arc of its visibility only extends sea-ward through less than a semicircle, or from its bearing S.S.E., round by the E. to N. ¼ W. But an isolated strip of light shows from the Patch Buoy, and to E. of that as far as Amherst Point.

In approaching Double Island from the S., during the night and in thick weather of the S.W. monsoon, a ship should not shoal under 12 fathoms (L. W. depth) till she sights the light. This caution is necessary, as the light is not visible when to the W. of a N. ¼ W. bearing. Thus a vessel, without taking the precaution of **sounding**, might get behind the light and on the Galloper Sands, which lie to the N. of Kalegouk Island.

KALEGOUK, or CALAGOUK ISLAND, extending from lat. 15° 30' to 15° 35½' N., lon. 97° 39' E., is the only place between Cape Kyai-kami and the Moscos Islands affording safe anchorage in the S.W. monsoon. The Island lies from 3 to 4½ m. distant from the main, its length being parallel with the shore; it is low by the sea and fronted with a reef. The passage inside has soundings from 5 to 9 fathoms, affording anchorage in 6 or 7 fathoms, in what is called Bentinck Sound, close to the highest land at the N.E. part of the Island, where fresh water may be obtained. A ship is well sheltered by the Island, and by the shoal-banks which extend from its N. end 5 m. to N. by E. There is a passage about a mile wide between the N.E. extremity of these banks and a small isle near the main, in which the soundings are from 6 to 9 fathoms; but the proper channel leading to the anchorage is round the S. end of Calagouk, at ½ m., off which is Cavendish Islet, with a reef projecting about ¼ m. to the S. The W. side of Calagouk is also lined by a reef, and

should not be approached under 11 or 10 fathoms. The greatest breadth of the Island is $1\frac{1}{2}$ m.; and on the highest part, which is *about* 500 ft. high, there were in 1862 some remarkable trees. Water of an excellent quality is procurable at a depth of 15 ft., and a perennial spring of sweet water flows through the centre of the Island. Wood and some fruit may be procured, and three or four tons of water per day in the dry season at Mahomed's Well, which is near the sandy beach $1\frac{1}{2}$ m. farther to the S. Buffaloes and rice are to be had at a village up Dermonjai Creek, on the main land opposite. H. W. on E. and C. at 12 h. 50 m. Rise, 19 ft.

Bentinck Sound. In proceeding round Cavendish Islet, pass to the S. of it about $1\frac{1}{2}$ m., in 7 or 8 fathoms; and when it bears about N. by W. haul to the N., and pass it on the E. side at any convenient distance, from $\frac{1}{2}$ m. to 1 m., it being safe to approach on that side; then steer along the E. side of Calagouk to the anchorage above-mentioned, and the soundings will be 6 or 7 fathoms, deepening to 8 fathoms in mid-channel between the island and the main, which is low; but there are two peaked hills about 3 leagues inland, and a high mountain at 7 leagues to E. by S.

Yay, or Yeah River. Pagoda Point, in lat. $15^{\circ} 12' N.$, lon. $97^{\circ} 47' E.$, forms the N. side, and the entrance of this river is fronted by a group of islands and reefs of breakers at the distance of 4 or $4\frac{1}{2}$ m., which seem not to admit of a navigable channel into the river for large vessels. Pootchoon, the N.-most, and Nai-ojooon, the S.-most of the group, are the largest of these islands; Thoatail, the central one, and another to the S.E., are small. Yeah Town is about 5 or 6 m. above the river's mouth, in lat. $15^{\circ} 14' N.$ A ridge of high land, that may be seen at 10 leagues' distance, extends to N. from Pagoda Point along the coast nearly 3 leagues, and several isles or reefs lie contiguous to the shore between Calagouk and Yeah River, which render it prudent to keep 4 or 5 m. off, in coasting along, and not to come under 12 or 11 fathoms, water. The flood sets along the coast to the N. at the rate of 3 m. per hour on the springs, opposite to Yeah River. From the group of islands fronting this river, other straggling islands and reefs extend along the coast at 4 m. distance, to lat. $15^{\circ} 0' N.$, with irregular soundings near them.

Ross Sand is a sand-bank 7 m. off the coast, its N. extremity being in lat. $14^{\circ} 58' N.$, where the least water found by Captain Ross was 3 fathoms; thence it stretches S. about 2 leagues, with depths from 3 to 4 fathoms, deepening to 5, 6, and 7 fathoms on its S. part, and having from 12 to 15 fathoms near its W. edge, with 10 and 12 fathoms inside. A ridge of high land extends from Yeah to the S., and approaches the sea opposite the above sand-bank, having two peaks forming a saddle, the N. most of which is in lat. $15^{\circ} 0' N.$ From hence to the Moscos Islands the coast should not be approached under $5\frac{1}{2}$ or 6 m., being fronted by rocks, and by a sand-bank with 4 fathoms, water, which stretches out 5 m. from the shore, in lat. $14^{\circ} 40'$ to $14^{\circ} 36' N.$, having a little to the N. of it the entrance of a river, fronted by rocks above water; the S. point of this river forms like a dolphin's nose.

In lat. $14^{\circ} 30' N.$, or just to N. of the Moscos, soundings of 22 to 28 fathoms are got from 6 to 10 leagues to the W.; but farther to the N., the depths decrease to 12 fathoms at the distance of 7 or 8 leagues from the land; and at the distance of 10 leagues from it, in lat. $16^{\circ} N.$, there are only 7 or $7\frac{1}{2}$ fathoms at L. W.

The Moscos Islands extend in a chain parallel to the coast, from lat. $14^{\circ} 28' N.$ to lat. $13^{\circ} 47' N.$, and distant from it $3\frac{1}{2}$ to 6 leagues, having a safe channel inside, with soundings mostly from 10 to 15 fathoms, deepening generally near the islands, and shoaling to 8 and 6 fathoms near the main. Between the S. and middle groups there are safe channels, and these are the largest and highest of these islands; the N. part of the chain is composed of straggling islands of various sizes, with several rocks above water. On the main land there is a mountain, visible nearly 50 m., which bears E. by S., and 16 m. from the N. Isle. At $1\frac{1}{2}$ m. to E. by S. from the N. Isle, there is a reef under water, and another reef about 2 m. to N. $\frac{1}{2}$ E. from the same isle, with a rock above water near the latter, called the N. Rock. Between this rock and the reef there is a channel with 17 to 19 fathoms, water, and close to both these reefs the depths are 16 and 18 fathoms. The **North Ledge**, a sunken reef, lies 8 m. off shore, in lat. $14^{\circ} 30\frac{1}{2}' N.$, about 4 m. N.E. by N. from the N. Isle; and there is a channel, with depths of 18 and 14 fathoms, about $1\frac{1}{2}$ m. wide, between the N. Ledge and the other reef to the S.W. Close to the N. Ledge on the inside, there are 9 fathoms, water, gradually decreasing to $4\frac{1}{2}$ or 5 fathoms, about $1\frac{1}{2}$ or 2 m. off shore, near the mouth of a large back-water, called the **Heansay Basin**, not yet surveyed, but with villages approachable by boats.

The S. group of Moscos Islands is distant 3 leagues from the nearest shore; the islands are steep, having 20 or 22 fathoms close-to on their W. sides.

TAVOY, or TAWAY POINT (the pagoda), in lat. $18^{\circ} 32' N.$, lon. $98^{\circ} 12' E.$,* forms the W. side of Tavoy River's entrance. It is moderately high, bluff, covered with trees, and may be

* A light-house on Tavoy Point would benefit both Tavoy and Mergui.

easily known by the Cap, a small, round, bushy islet, bearing from it W. by S., distant 2 m. Inside of Tavoy Point there is good anchorage over a soft, even bottom, and a large ship need not bring it to the S. of S.W. by S., where she may anchor in 6 fathoms, about 1 m. (not farther) from the Point; but a small ship of light draught may go in much farther.

This place is convenient for wooding and watering; the water is filled at a small brook, a little way round to N. of the point, and near a rocky islet, which is not more than 10 or 12 yards from the shore. About 2 m. to the N. of the watering-place lies a salt-water creek, abounding with alligators; they are so numerous that none of the people belonging to ships should be permitted to bathe either alongside or near the beach. Ships proceeding to the anchorage under Point Tavoy to procure wood or water, may, with a leading wind, steer towards the Cap, and pass it within 1 m. The soundings from the offing decrease to 15 or 14 fathoms near to Cap Islet, and there are 18 or 19 fathoms close to Tavoy Point, which depths continue until it bears nearly N.N.E., when Reef Island, high and remarkable, up the harbour, begins to open, and the depth will decrease to 10 or 9 fathoms in hauling round to the N. When the Cap is shut in with the point, there are 7 or 8 fathoms at the distance of a mile from the shore, and when the point bears S.W., or S.W. by S., anchor near it in 6 fathoms at H. W. The tides are not very regular; H.W. about 10½ h. on F. and C. of moon, and the rise is 17 or 18 ft.; the velocity of stream in the river is about 3½ knots on the springs.

Tavoy Town, in lat. 14° 5' N., lon. 98° 13' E., stands on the E. bank of the river, about 11 leagues from the entrance, where extensive rice fields are cultivated in its vicinity. Vessels of 120 tons burden can reach the town, and the river is navigable by boats for 50 m. above Tavoy to Nyoung-ounlay. Numerous shoals, and low islands, render navigation intricate, the channels having in places only 2 fathoms, but in many parts the depths are from 6 to 8, and 12 fathoms.

If a ship round Tavoy Point with a strong Southerly wind, it would be unpleasant to anchor in the outer road under the point; in such case she may run into the river, after half-flood, passing Reef Island on the E. side at ¼ to 1 m. distant, then keep within ¼ m. of the other islands which bound the river on the W. side, and the soundings will not be less than 5 or 5½ fathoms in this track. At 2 or 3 m. to the N. by W. of Reef Island, she may anchor close to the W. shore, or she may run farther up into 4 or 4½ fathoms, where she will be well sheltered to the N. of the third large island, where there is fresh water at a well. The E. shore of the river is fronted by a shoal-flat that occupies nearly half the breadth of the river, dry at L. W. spring tides in some places, towards which the depths gradually decrease from the W. side of the channel. If proceeding up the river, steer to pass to the E. of Reef Island, not less than ¼ m. off. Button Island is 2 m. farther up, and may be passed pretty close, but not exceeding 1½ m.; from hence, the channel continues close along the W. shore, where deepest water is found. A rock, with 9 ft. at L. W. springs, makes this part dangerous, needing a pilot, and may be avoided to the E., by keeping the Button and Reef Islands a little open, until above the second bluff or rocky point beyond the Button. The best anchorage for large ships is close to the uppermost bluff or rocky point; vessels drawing only 14 or 15 ft. water may proceed 4 or 5 m. farther up, and find good anchorage. The tide rises about 14 ft. during the springs in the S.W. monsoon; H. W. on F. and C. of moon at 2½ h.

THE MERGUI ARCHIPELAGO. The bank of soundings extends for some distance outside these islands, but has not been yet thoroughly examined;* near some of them the water is deep, yet the lead must be kept going in the night, and in passing through any of the channels, or inside islands, a good look-out will be necessary, as some undiscovered dangers may exist.

The islands of the Mergui Archipelago extend from Tavoy Island, in lat. 13° 13', to the Seyer Islands, in lat. 8° 30' N., and in some parts lie 60 m. off the main land. These islands, being usually high, may be seen from 10 to 15 leagues. They are covered with large trees, thick under-wood difficult to penetrate, and scarcely an acre of level ground on any one island fit for cultivation; which may account for their having no inhabitants. Malays, and a few Chinese from about Penang, visit the Archipelago annually, to collect edible birds'-nests, found more or less in almost every little rocky island. The proas from Penang and the Straits may be nearly one hundred; they are too small to carry cannon, and they avoided us (says Captain Ross), which shyness might arise from their trespassing on the rights of those who farm the collection from Government. On the beaches of several islands, the marks of the deer and hog were seen. The islands rest on a rocky basis, and on many of the rocks wholesome oysters abound; also good fish, although cat-fish only were caught, almost daily, sufficient for a fresh meal. There are many small barren rocks amongst the islands, usually with deep water near them, but few hidden dangers were found.

* Mer Majesty's ship *Dolphin* struck on a shoal, behind Bentinck Island, in the year 1872.

The **N.E., or Fair-weather Monsoon**, commences on this coast about mid-Oct., at which time the wind hangs much at E., occasionally blowing fresh. In Dec., about noon, the sea-breeze sets in from N.W., veering to N. about sunset, and by midnight the wind is from E.N.E. or E., at times blowing strong between sunset and 11 a.m.: therefore, by keeping near the islands, a ship will get rapidly to the N.; whereas, in the offing, the wind is chiefly from N.N.E. to N.N.W. In March, the sea-winds set in from the S. of W., with light winds and calms in the offing; on two occasions, in Feb. and March, we made but 8 or 10 m. per day, from very light weather experienced between Cabossa and Negrais, with a drain of current to the S. In April, the afternoon becomes squally with the wind at E., and much thunder and lightning amongst the islands. In the fair season, when no rain falls for several months, many of the mountain streams become dry, and fresh water is not easily procured. Hastings Harbour affords but a small supply at such times. Fresh water has been obtained in the driest part of the season, at two stations on the E. side of Tavoy Island; one just within the small group of islands to the N. of Port Owen; the other near a small pagoda abreast of a small island near the S. extreme. Also in King Island Bay, on the W. shore, about 2 m. from the W. point of entrance; also on the W. side of Domel Island, at some sandy beaches well within the strait which divides Domel and Bentinck Islands. On the W. side of Sullivan Island, at beaches nearly under the highest hill of that part, there is a plentiful stream in the bay, having a large white rock in front: this is the most convenient watering-place for a passing vessel in the N.E. monsoon, being easy of access, with good anchorage. On the E. side of St. Matthew Island, in a bay to the S.W. of the Dolphin's Nose, there is a well of good water.

The **S.W., or Rainy Monsoon**, does not set in until about mid-May, after which the Archipelago is subject to very squally weather for successive days, and a deluge of rain; judging, however, of the weather by the *Nearchus's* log-book, which vessel was the whole rainy monsoon of 1818 amongst the islands, it appears that a vessel may easily beat to the S. within the islands, as the *Nearchus* frequently had the wind from S.E., and several successive days of fine weather.

Tides. In the Archipelago the rise and fall of spring-tides is from 13 to 15 ft., and the greatest velocity experienced was 3 knots per hour, depending on the direction of the channels; H. W., on F. and C. of moon, from 10 to 11 hours amongst the islands. In the offing the flood sets in from the W.; the direction of the stream within the islands is governed by the channels, but if broad and clear, the ebb runs from E., and the flood from W. The influence of the tides will probably not be felt above 4 or 5 leagues from land, and if within the influence of regular tides, the lines of strong rippings common on this coast are not felt. At a little distance W. of the islands, and to the S. about Junkseyon, in calm weather during the N.E. monsoon, these strong rippings extend in long lines parallel to the coast, and move past a vessel towards the land at the rate of 7 or 8 m. per hour, without her being carried along with them. They frequently break high, are dangerous for small boats, and alarming to strangers: they come in quick succession on the flood-tide in-shore, and disappear on the ebb.

Tavoy Island extends from lat. $13^{\circ} 13'$ to $13^{\circ} 55'$ N., the N. end bearing from Tavoy Point about S. by E. $\frac{1}{2}$ E., distant 19 m.; it is of middling height, about 2 m. in breadth and 6 leagues in length, stretching N. by W. and S. by E., having a peak near the middle, and a smaller one near its S. end. Near the S. end of the island there is a pagoda, and near it good fresh water. **Port Owen**, a safe and good harbour, having an abundant supply of good water and wood, is on the E. side of Tavoy Island, on the N. side of a projecting peninsula in lat. $13^{\circ} 5'$ N.; it is also sheltered to the N. and E. by a cluster of islands, and has a depth of water from 5 to 10 fathoms. Ships having occasion to sail between Tavoy River and Mergui in the S.W. monsoon ought to depart from Tavoy Point, or from the anchorage under the N. end of Tavoy Island, so as to get across in one ebb-tide, for the intervening coast is in that season a dangerous lee-shore, and if a ship were to meet with the flood-tide, and the wind fail between these places, she would be obliged to anchor in deep water, exposed to a high sea, destitute of shelter. From Tavoy River the ebb sets along the coast to the S. nearly half way to Tavoy Island, where it is met by the ebb from the channel between the latter island and the main; then, after uniting, it appears to set out to seaward. The flood comes in from the sea between Tavoy Point and Tavoy Island, separating into two branches, one running N. and the other S., to supply Tavoy and Mergui Rivers.

The W. side of Tavoy Island *appears* steep-to, but vessels had better not pass between it and **Great Canister**, as several rocks and rocky islets lie to N.E. of the latter, and some high rocks bear from it about S.E. by E., 4 m. off.

Cabossa, in lat. $12^{\circ} 48'$ N., lon. $97^{\circ} 53'$ E., lying 11 leagues to S.W. of the N. point of Tavoy Island, is a moderately high island, having a small islet or rock near it on the N. side, and near the W. Canister are other islets. In coming from the S., these islands may be easily known, as no others are seen to the N. of Cabossa.

Tanasserim Island Peak, in lat. $12^{\circ} 34' N.$, lon. $97^{\circ} 52' E.$, and $4\frac{1}{2}$ leagues S. of Cabossa, when first perceived from sea-ward makes in several hills, appearing like separate islands, which on a nearer view are found to join. To the N. and S. of it, several islands appear of different sizes; of these the outer one and most remarkable is the **W. Canister**, in lat. $12^{\circ} 41\frac{1}{2}' N.$, lon. $97^{\circ} 44\frac{1}{2}' E.$, a high, steep, small, round island, $8\frac{1}{2}$ m. to the N.W. of Tanasserim, and 8 m. to the S.W. of Cabossa. **Freak Islet** is 9 m. to E. of W. Canister, and a dry rock stands mid-way.

A ship having made Cabossa Island may pass to the N., or between it and the W. Canister, at discretion, then steer to the E. in soundings from 30 to 35 fathoms; as the tides set very irregularly amongst these islands, they require attention; off Cabossa it is H. W. about 8 h. on F. and C. of moon. Having passed Cabossa, the **Little Canister**, a high, steep, round island, covered with trees, will be seen directly to the E., distant $6\frac{1}{2}$ leagues; it somewhat resembles the W. Canister. The Little Canister is bold and steep, may be passed on either side as convenient; but about 3 leagues S.W. by S. from it there is said to be a rock even with the surface of the sea. The Brown Rock and many others lie 8 m. to S. by W. and to S. of Little Canister.

Great Canister, in lat. $12^{\circ} 56' N.$, a high, irregular island, bears from the former N. $\frac{1}{2}$ W., 5 m., and is also safe to approach. Having passed the Little Canister, a ship ought to steer E. from it, between the islands off the S. point of Tavoy Island and the N. end of Iron Island, where the channel is about 3 m. wide, and clear of danger; but the bottom in it being rocky, and the depths great, from 24 to 38 fathoms, with strong eddies at times, anchoring here is unsafe. Farther out, with the Little Canister bearing W.N.W. 2 leagues, there are 35 fathoms, gravel and mud, and between it and Cabossa Island the depths are generally from 35 to 22 fathoms, where a ship might anchor occasionally.

King Island, which is more than 7 leagues in length, lies off the entrance of the Tenasserim River; and to the N. of it, is the much smaller **Iron Island**, the N. part of which terminates in a point with rocks above water, having close to them from 25 to 30 fathoms, water. From it bearing N. $\frac{1}{2}$ W. lies the S. part of Tavoy Island chain, formed by several islets and rocks, also steep-to. After passing in mid-channel between these, **Long Island** will be seen bearing E. by S.; it is about 10 m. from Iron Island, and on the edge of a rocky bank that lines the coast from Tavoy River to the entrance of Mergui River. The edge of this bank, or Long Island, need not be approached; but when round the N. point of Iron Island, it is best to steer to the S.S.E., along its E. side at 2 m. distance, towards the N. point of Plantain Island, which forms the E. side of King Island Bay; the depths will be various, from 36 to 17 fathoms, decreasing towards the coast.

There is also a narrow channel between Iron Island and King Island, but destitute of good anchorage, the water being deep, with strong tides running in eddies; if the tide fail a ship in steering from Cabossa towards this channel, she should anchor as near to Iron Island as convenient, until the first of next flood; in entering the channel, she must keep nearest to Iron Island until past the islets and rocks that stretch out from King Island, the outermost islet being very low and surrounded by rocks. Although this channel might be pursued with a steady commanding breeze, that to the N. of Iron Island ought to be preferred at all times.

King Island Bay, formed between the N.-most high land of King Island, and the E. peninsula of that island (formerly called Plantain Island) is a place of shelter for ships; but in entering it care is requisite to avoid the **Lys Shoal**, which bears N. by E. $\frac{1}{2}$ E. about $1\frac{1}{2}$ m. from the N.W. point of the bay, a reef of rocks with only 9 ft. at L. W. When on it, Panella Island was on with the highest part of the N.E. point of Plantain Island. **Panella** is a small islet upon a sand-bank with some trees, situated a little way from the N.W. point of Plantain Island, and with no channel between; a reef of rocks stretches to the S.W. and W., part of it only visible at L. W. A ship had better not enter King Island Bay without a native pilot. The tide rises here about 16 ft., and it is H. W. about 10 h. on F. and C. of moon.

MERGUI, called Beit Myoo by the Burmese, in lat. $12^{\circ} 27' N.$, lon. $98^{\circ} 37' E.$, is situated at the entrance of the principal branch of the Tenasserim River, and a port of considerable trade, now under British Government; the country is fertile and considered to be healthy, with a safe harbour and an excellent inland navigation, well adapted for commerce. Elephants' teeth, wax, wood, oil, and other articles, are exported from hence in ships belonging to merchants that reside here, who in general are natives of Hindoostan. Water may be had in great plenty from a run on Madramacan Island, also on Plantain Island, and in King Island Bay.

Tides. In Mergui Harbour the tides are less strong than they are even in Tavoy River, and rise from 18 to 22 ft. during the springs; H. W. about 11 h. on F. and C. of moon at the town. This harbour is very safe, and will contain many vessels.

Mergui Anchorage, off the entrance of the river, is about 6 leagues to the S.E. of Iron Island. A ship being abreast the latter, and bound to the anchorage at Mergui, should give the

Lys Rock a good berth, by keeping Little Canister *hidden* behind Iron Island S.W. point, till Penella Islet bears S.S.E.; then pass the N.E. point of Plantain Island about 1 m. off, and pass on in mid-channel, with the Little Canister kept in sight between Iron Island and Plantain Island, the soundings will decrease, but not always regularly, from 15 to 13, 12, 9, and 8 fathoms. The best anchorage for large ships is in 6 fathoms at L. W., with the N. point of Plantain Island on with the S. part of Little Canister, and about 1½ m. from the beacons at the river's mouth; here the W. side of Madramacan Island (which forms the S.W. side of the river's entrance) will bear about S. by E., distant 3 or 4 m. The beacons are crowned with bamboo wicker-work, whitewashed, and are placed in sandy ground, liable to be washed away; buoys are therefore kept ready to replace them. The distance is about 2 leagues from the road to the town of Mergui; vessels of moderate size, by taking pilots, can go over the bar into the river, and anchor off the town in 5 fathoms, water. The proper course to follow is to keep in mid-channel between the beacons, and run up abreast the Government wharf, where the best anchorage is in mid-channel. The best time for a vessel drawing above 13 ft. water to weigh anchor from the road is at half-flood, when she will have sufficient water to run with to Mergui; but she ought to have a favourable wind, as the channel is too confined in some parts to admit of tacking.

In sailing from the road, a ship should observe the same marks as in entering—keep the Little Canister touching the S. point of Iron Island; and when abreast of Penella Islet, let the Canister disappear behind, and pass to the N. of Iron Island.

Directions. Ships bound from the Coromandel coast or Ceylon to Mergui, in the S.W. monsoon, ought to pass through the channel between the S. end of Little Andaman and the Carnicobar Islands, or between the Little and Great Andamans, if they fall to leeward of the former. Those which come from Bengal in the same season, may sight the light on the Cocos Islands, or pass between them and the N. end of Great Andaman; and after passing near Narcondam, they should steer for Tenasserim Island, distant from Mergui about 15 leagues to the W.N.W. Tenasserim Island should be also sighted by ships which pass to the S. of the Andamans. After leaving Narcondam, soundings will soon be got in steering for the islands off Mergui.

Ships bound from Bengal to Mergui during the whole of the N.E. monsoon, may sight the Alguada Reef Light; then steer to make Tavoy Island, or the Moscos Islands, if the wind blow steadily from the N.; they may then pass inside of Tavoy Island in proceeding towards Mergui, or to the W. of that island, betwixt the islets off it and the Canisters, and afterwards betwixt it and Iron Island. In the strength of the N.E. monsoon, ships from the Coromandel coast should also pass to the N. of the Andamans, and from thence take every advantage to get to the E.

Ships being off Point Tavoy or the Moscos Islands with a N. wind, should steer for the N. end of Tavoy Island, in which track they will have various depths, from 20 to 15 or 13 fathoms, usually over a mud bottom, until near that part of the island; they ought, then, to proceed by the inner channel on the E. side of Tavoy Island, keeping nearer to the islets that lie off it than to the extensive rocky bank that fronts the main; opposite the E. part of Tavoy Island, the channel is about 4 m. wide, with soundings of 10 to 16 fathoms, irregular, near the islets; but the depths throughout this channel decrease gradually to 5, 4, and 3 fathoms towards the edge of the bank that fronts the main. There is a small island called the Bank Canister, not far from the shore-bank, and opposite to the S. part of Tavoy Island; some other islands with reefs lie on the edge of it farther to the S.E., then Long Island, with other islets and reefs between it and the mouth of Mergui River. Betwixt the projecting E. part of Tavoy Island and the group of isles on the N. side of it, and opposite to the highest N. peak, lies Port Owen, forming a bay or harbour, having depths of 8 and 7 fathoms.

Departing from Mergui in the N.E. monsoon, ships ought to pass through some of the channels between the N. end of the Great Andaman and Alguada Reef, whether bound to Bengal or the Coromandel coast, and conform to the directions already given for sailing from Rangoon Bar in this monsoon. But, if Feb. is commenced, those bound to the Coromandel coast ought to proceed by the channel to the S. of the Little Andaman, and make sure to fall in with the Madras coast to the S. of their port, for S. winds then begin to prevail, with a current setting along the coast to the N. Ships bound to Acheen, after rounding the outer islands of the Archipelago, may steer direct for the Golden Mount, 7 leagues E. of Acheen Head. If bound to Malacca Strait, they may steer for the Seyer Islands, or the S. end of Junkseylon.

If a ship leave Mergui in the S.W. monsoon, she should take every advantage to work to the W. clear of the islands, and pass through the Cocos or Preparis Channel, if bound to Bengal. She must stand to the S. when she can clear the islands, if bound to Malacca Strait, Acheen, or the Coromandel coast, and follow the directions given for sailing from Rangoon Bar in the S.W. monsoon. Ships departing from Tavoy or Mergui during the S.W. monsoon, are liable to experience consider-

able difficulty in obtaining an offing; a favourable opportunity ought, therefore, to be embraced in sailing from either of these places; and if the weather become tempestuous, it will be prudent to work to windward, with the anchorage of Tavoy Point or that under Tavoy Island open, until sufficient offing is made to be enabled to weather the islands of the Mergui Archipelago, if bound to the S.; or of reaching the coast of Pegu to the W. of Rangoon River, if bound to the N.

The W. MERGUI GROUP.—The Great Torres, the W. islands of the Archipelago, are two high islands, lying E. and W. of each other, with some small islets near them. The centre of the W. island is in lat. $11^{\circ} 47' N.$, lon. $97^{\circ} 27' E.$ Little Torres Islands, 3 leagues S. by E. from Great Torres, are a group of three or four small straggling isles. Hayes Island stands 8 m. to E.N.E. of the W. Torres, and in the line from it to Cabossa several others lie; no vessel without a good chart should try the passages amongst them.

Black Rock, visible 8 m., lies in lat. $11^{\circ} 23' N.$, about $8\frac{1}{2}$ leagues S.S.E. from the W. Great Torres Island, and about 6 leagues to W. of the Five Sisters. **Nearchus Rock** lies in lat. $11^{\circ} 42\frac{1}{2}' N.$, lon. $97^{\circ} 53' E.$, at 7 leagues to E. by N. of the Little Torres, and 3 leagues to the W. of Bentinck Island; it is covered at H. W. with depths close round it of 35 to 31 fathoms.

Bentinck Island. If a ship be to the S. of Torres Islands, and in want of some shelter, she may pass near to the group of the Little Torres. The S.-most of the small islands is in lat. $11^{\circ} 37' N.$, lon. $97^{\circ} 32' E.$, and visible at 4 or 5 leagues' distance. By steering E. from it 22 m., a small group of four rocky islands will then be about 5 or 6 m. to the S. of you, and Nearchus Rock distant about 5 m. to the N., but always shows breakers: the S. extreme of Bentinck Island will bear about E. from you, distant 4 leagues. Steer to pass about 3 m. to the S. of this island, in order to avoid some small isles near it, and a reef of rocks, always dry, distant about $2\frac{1}{2}$ m. to the S. of the point; in this run the depth will be from 45 to 23 fathoms. When abreast of Bentinck Island, Dömel (which is high, mountainous land) will bear E. from you, and a group of islands named Five Sisters will bear to the S., distant about 10 m. Steer up the strait* to the N. for the South Passage Island, $8\frac{1}{2}$ m. distant from the S.E. point of Bentinck Island, and anchor to the N. of it in 7 or 8 fathoms in Bentinck Harbour, where you will be land-locked and secure from all swell in good holding-ground, mud and sand.

The N. passage out of Bentinck Harbour is between W. Passage Island and an islet crowned with a tuft of trees, named Cap and Feather; this passage is 2 m. wide, having 5 and 6 fathoms near the W. Passage Island, decreasing near Cap and Feather. But this navigation is dangerous, as the **Warning Rock** and others lie from 4 to 6 m. to N.W. by W. of Cap and Feather.

To proceed from Bentinck Harbour to the S., pass between the Sisters and Bushby Island, then between the Father and Son and Owen Island, into Forrest Strait, or Passage.

Whale Bay, formed between Kisseraing Island and the mouth of Linya, or Lay-nya River, seems to afford good anchorage, but the lapse of more than thirty-five years, since the surveys of Captains Ross and Lloyd, is certain to have produced great changes along the coast-line, in both Auckland and Whale Bays.

The N. and S. TWINS are the outermost or W. islands of the S. group of the Mergui Archipelago, and they lie to the S. of Forrest Passage. The N. Twin is in lat. $10^{\circ} 38' N.$, lon. $97^{\circ} 41' E.$, and the S. Twin is 10 m. farther S., or about 12 m. to W. of Loughborough Island. **Investigator Channel** is the wide passage that lies between S. Twin and Horsburgh Islands.

Outside Banks of Soundings.—**Heckford Bank**, in lat. $10^{\circ} 20' N.$, a shoal having from 7 to 18 fathoms, lies 30 m. to W. by S. of the S. Twin; and another coral shoal, with 11 fathoms, has been found at 14 m. due S. of the Heckford. **Roe Bank**, another coral shoal, with 8 fathoms, lies in lat. $10^{\circ} 1' N.$, lon. $96^{\circ} 37' E.$ The existence of the above three banks points to the probability that many others may exist off the Mergui Archipelago.

Forrest Passage, in lat. $11^{\circ} 5' N.$, is the best leading into the Archipelago, and if approached from the S.W., **Clara Island** will be first land seen, which is high, and having small peaks, the S. one very sharp, like a sugar-loaf. Pass about 1 m. to N. of the N. Centinel (a small isle and a rock, off the N. part of Clara); thence steer to pass off the N. end of Sullivan Island about $1\frac{1}{2}$ m.; nearer to it is uneven ground with strong eddies. If blowing strong from the S.W., haul to the S. to pass between the islets off Sullivan Island and High Island, which is 5 m. to the E. of them. If merely seeking shelter from S.W. winds, you will find very smooth anchorage after passing round the N. point of Sullivan Island, and a little way to the S.E. of Olive Island, in 6, 7, or 8 fathoms. In Forrest Passage, in the N.E. monsoon, it sometimes blows so strong, that a ship will be unable to gain ground, except with a weather-tide.

* Her Majesty's ship *Daphne*, in 1872, went too close to Bentinck Island, and stuck on a rock, lying 1 m. off shore, and bearing S. by W., 3 m. from S. Passage Island.

In passing to the S. from the N.E. part of Sullivan Island, a vessel should have a good chart; without that, it is better to avoid navigation amongst these islands. The channel to the E. of Sullivan Island, and between the **Gregory Islets** and the main land, is preferable, as the depths are moderate for anchorage, with good holding-ground; and the tides run N. and S. about $1\frac{1}{2}$ m. per hour on the springs. The Gregory Islands are very rocky around, but the channel to the E. of them is fully 2 m. broad, and thence a due S. course takes a vessel towards the Five Islets, Hastings Harbour, and Pack-chan River. All the country boats, passing near the shore to the E. of the Gregorys, afford cause to believe it to be a part of the continent. Several small brigs, of easy draught of water, and junks, trade between Penang, Mergui, and Tavoy; their route is usually through Forrest Strait to the N., passing to the E. of Owen Island; when they get abreast the middle of Domel, the passage becomes very shallow, being nearly dry all across, with a narrow passage through the sand, which lies on the W. side of the channel, near the Domel shore.

Investigator Channel. Another clear and safe entrance into the S. part of the Archipelago, for ships going to Hastings Harbour, is by passing to the S. of the **S. Twin** in lat. $10^{\circ} 28' N.$, lon. $97^{\circ} 40' E.$, and leaving **Horsburgh Island** (in lat. $10^{\circ} 12' N.$) to the S., and Loughborough Islands to the N.: this channel is quite safe, $4\frac{1}{2}$ m. wide in the narrowest part, between Cavern Island and the N. islands of the St. Andrew group; the course is about E. and a ship may pass between St. Luke and Russel Islands, to enter Hastings Harbour.

Hastings Harbour is very smooth and secure during both monsoons, but care is required in entering by the E. Channel, for a dangerous patch of rocks, of 12 ft., lies about half way from St. Matthew Island towards Hastings Island; also a rocky reef 1 m. off the S.E. side of Hastings Island, for which the lead gives no warning. The surveying vessels traversed all over Hastings Harbour, and discovered no other dangers. The strait abreast of Hastings Harbour becomes contracted by a shoal-bank extending from the islands on the W. side of Pack-chan River entrance; in passing through, keep nearest to St. Matthew.

St. Matthew, or Elephant Island, about $5\frac{1}{2}$ leagues in length, or from lat. $10^{\circ} 4' N.$, extending S.W. by S. to $9^{\circ} 50' N.$, is 14 m. from the continent, and may be seen at a great distance, the highest peak in the middle of the island being nearly 3,000 ft. above the sea-level, and is visible 18 leagues. At the N. part of the island is Hastings Harbour, surveyed by Captain Ross, the Indian Marine Surveyor, who makes the centre of the harbour in lat. $10^{\circ} 6' N.$ There are two channels into the harbour, the N. one to the W. of Hastings Island being the best.

The tide in it is very weak; H. W. at 10 h. 40 m. on F. and C. of the moon, and the rise is 13 or 14 ft. Amongst the islands, eddies and irregular tides prevail.

The **St. Andrew Group**, consisting of several islands, extends from lat. $10^{\circ} 2'$ to $10^{\circ} 13\frac{1}{2}' N.$; the W. one is $5\frac{1}{2}$ leagues to the W. of St. Luke Island, and **Horsburgh Island**, in lat. $10^{\circ} 12' N.$, lon. $97^{\circ} 52' E.$, stands 4 m. to N.W. of this, having a safe channel, called Investigator Channel, on the N. side of the group. To the W. of St. Andrew Group, there are three shoals (not dangerous), called Heckford and Roe Banks, and the coral shoal; mentioned under the description of the N. and S. Twins.

The Aladin Islands. To the S. of St. Matthew, this group of islands and rocks extends 18 m. in a S.W. by S. direction; having 17 and 18 fathoms, water, near them, decreasing regularly towards the continent; between them there is a safe channel 10 or 12 m. wide. These islands are mostly high and safe to approach on the outside, but there are some reefs amongst the group, with rocks above water in some places; therefore any ships, bound to Pack-chan River, had better pass to the S. of Christie and Auriol Islands.

Davis Island, lying 4 m. W.S.W. from St. Matthew, is the principal island of the group; it is about 10 m. in circumference, and may be seen at the distance of 7 or 8 leagues. There are three small islands to the W. of Davis Island, and between 5 and 9 m. from it: N. Rocky Island, in lat. $9^{\circ} 53\frac{1}{2}' N.$; W. Rocky Island, in lat. $9^{\circ} 51\frac{1}{2}' N.$; and the Haycock, in lat. $9^{\circ} 41' N.$ Auriol Island, the S.E. of the group, is in lat. $9^{\circ} 39' N.$; and **Christie Island**, the S.-most, is in lat. $9^{\circ} 36' N.$, and in lon. $97^{\circ} 57' E.$, having an islet near its S. point surrounded by a reef; it is 7 m. W. by S. from Auriol Island. The Haycock lies $4\frac{1}{2}$ m. W.N.W. from Christie Island.

Chance Island (the peak), in lat. $9^{\circ} 25' N.$, lon. $97^{\circ} 51' E.$, and distant $3\frac{1}{2}$ leagues to the S.S.W. of Christie Island, may be seen 10 or 12 leagues; it is 5 m. long, N. and S., the high peak being near the middle, but nearer the S. end; it has some islets around it, and rocks above water near its S.E. point. This may be considered as one of the Aladin Islands, although there is a safe channel, about 8 m. wide, between it and Christie. Nearly in a line, about mid-way between Chance Island and the Seyers, lies **Middle Island**, by itself, in lat. $9^{\circ} 4\frac{1}{2}' N.$; it is high, and may be seen 8 or 9 leagues, and between it and Chance the channel has soundings of 32 to 46 fathoms, and is $5\frac{1}{2}$ leagues wide. **Perforated Island**, in lat. $8^{\circ} 50' N.$, situated $4\frac{1}{2}$ leagues S. from Middle Island,

and 4 leagues N.E. from the N. Seyer Island, is another detached island. The channel betwixt these islands and the main is 5 leagues wide, having regular soundings from 20 fathoms off the N. Aladin, where it is only 4 leagues wide, to 12, 10, and 8 fathoms near the numerous islands and banks off the coast.

The Coast. Opposite the N. end of St. Matthew, and off Victoria, or Malewan Point, commences the chain of islands that front the coast, and extend about S. by W. to lat. $9^{\circ} 20' N.$; an extensive bank of sand and mud extends off to the W. and S.W. of Victoria Point, and chokes the channels leading into the Pak-chan River. The largest islands of this chain are **Saddle Island**, in lat. $9^{\circ} 50' N.$ (centre), and **Delisle Island**, in lat. $9^{\circ} 44' N.$; they are separated from each other by an opening $1\frac{1}{2}$ m. wide, having a 2-fathom shoal in it, but with anchorage of 7 to 4 fathoms inside; but neither this anchorage, nor the other parts, have been examined sufficiently. About $\frac{3}{4}$ m. to S.W. of Delisle Island, there is a rock under water, having close to it 8 fathoms. Vessels, wishing to enter the Pak-chan River, should pass to the S. of Delisle, haul up along its E. side, and anchor, till they get a pilot for the river. In lat. $9^{\circ} 41' N.$, there is a high peak on the main land formed like a funnel.

The PAK-CHAN RIVER, separating British Burmah from Siam, lies to the S. of the Malewan District of Tenasserim Province. **Malewan Town**, in lat. $10^{\circ} 11' N.$, lon. $98^{\circ} 38' E.$, or about 4 leagues to N.N.E. of Victoria Point, is becoming of commercial importance under British rule, having the tin mines of Mulleywoon (Malewan) in its vicinity. On the opposite side of the river, the Siamese have also good tin mines. The E. I. C. steamer *Nemesis* found plenty of water in the river's entrance; and doubtless, if surveyed and buoyed, this would be found a good port.*

A vessel proceeding to Pak-chan River should be furnished with the large-scale Admiralty Chart of the Mergui Archipelago down to the Seyer Islands.

The Seyer Islands may be considered as the termination of the Mergui Archipelago; they are not so elevated as some of the Aladin Islands, but are bold, safe to approach, and may be seen 8 or 9 leagues. The Great Seyer (nearly 800 ft. high), with two rocky islets off the S. end, and that, called N. Seyer, off its N. side, is about 20 leagues to N.W. of Junkseylon Peak. Captain Ross places the **N. Seyer** in lat. $8^{\circ} 41' N.$, and lon. $97^{\circ} 36\frac{1}{2}' E.$ On the E. side of Great Seyer there is anchorage near shore, although the depth is considerable. A dangerous reef of rocks is said to lie about 3 m. to E. of the island, next to the S. one; this reef is fully $\frac{1}{2}$ m. in extent, and only shows two small black rocks a little above water.

SIAM COAST, BORDERING ON BRITISH BURMAH.

The coast to the S. of Pak-chan, now belonging to Siam, has no sheltered ports till you come to Junkseylon, and, being unsurveyed, it is little known to navigators. It is fronted by some islands, called the Sugar Loaves; and to the N. of them stands **Impey Island**,† in lat. $9^{\circ} 35' N.$, lon. $98^{\circ} 21' E.$; whilst to the S. of them is Hayes Island, which is 14 m. to S. by W. of Impey, and about 4 m. from the main land, this being the last island till you come to Junkseylon.

This Queda or Kedda coast will be found described as a part of Malacca Strait.

* The rapid development of the trade of British Burmah, by means of steamers, may soon call for light-houses, buoys, and beacons, at Pak-chan and Mergui.

† Vessels entering Pak-chan River should pass between Impey and Auriol Islands.

THE ANDAMAN ARCHIPELAGO.

(VARIATION AT ANDAMANS, 2° E.; AT NICOBARS, 1½° E.)

Preparis Island, the N.-most of the group, lying 55 m. to S.W. by S. from Alguada Reef Light, extends nearly N. by E. and S. by W., from lat. 14° 49' N. to 14° 56' N., being 7 or 8 m. long and 2 broad, is of moderate height, sloping gradually all round towards the sea, covered with wood, steep-to on the E. side, having 7 fathoms, water, near the shore. At the N. end there are two islets, called the **Cow and Calf**, in lat. 14° 56' N., lon. 93° 39' E., apparently steep-to, and on the W. side two other small islets, on the great reef that lies off the W. side of Preparis; a long reef projects 4 m. from its S. extremity, with part of the rocks visible above water. Two detached reefs lie off at 5 and 6 m. to S.W. of the island.

On the E. side of Preparis Island, large ships can safely anchor in 12 or 14 fathoms; a small vessel might anchor about ½ m. off shore, in 8 or 9 fathoms, with the extremes of the island from N. to about S.W.; the reef projecting from the S. end will give shelter from a S.W. swell; and the two islets off the N. end will be about half a point open of the island, and boats may land with safety. About 2 m. from the E. side of the island there are 24 fathoms, and close to the reef at the S. extremity 30 to 36 fathoms; farther to the S., no ground is got with 100-fathoms line in mid-channel, between it and the Cocos Islands; but when the latter are approached within 2 or 3 leagues, bearing to the S.S.W., there is ground from 36 to 32 fathoms.

Between Preparis and Alguada Reef the soundings vary from 44 fathoms near mid-channel, to 24 or 22 fathoms near the former, and 17 or 18 fathoms near Alguada Reef. The **Thalia Bank**, with 12 fathoms (least water), lies 21 m. to N. by E. of Preparis, and amongst soundings of 45 fathoms. (*See* page 496).

GREAT COCO, bearing from Preparis Island S. by W. ¼ W., distant 45 m., and extending from lat. 14° 4' N., to 14° 11' N., is in lon. 93° 21' E. It is nearly 7 m. in length N. and S., and 2 m. in breadth, covered with trees, some of which near the sea are cocoa-nut trees; the island is a little uneven in its contour, and may be seen 6 or 7 leagues. Off the N. end there are two islets, called the **Table** and **Slipper**, from their appearance; the **Table Islet** is more than 100 ft. high, and now has a light-house. Another islet is connected with the S. end by a reef of rocks, just covered at H. W., said to extend about 4 m. A ship may anchor on the E. side of the Great Coco in from 14 to 20 fathoms; also on the W. side, in the N.E. monsoon.

Light. **Table Island**, in lat. 14° 12½' N., lon. 93° 18' E., has now a good light-house, an iron tower, with alternate red and white bands; it shows a *fixed* light, elevated 195 ft. above sea-level, visible 22 m. in clear weather. The light is not seen by a vessel when to the S. of Great Coco, or when it bears between N. by E. and N.N.W.

Little Coco lies about 3 leagues to the S.W. of the Great Coco; it is about 2½ m. long, N. and S., and ½ m. broad; it is low round the margin, but with an elevated central plateau covered with trees, of an even appearance, and may be seen 6 or 6½ leagues. Trees cover it in every part, some of which, facing the sea, are cocoa-nut or Palmyra trees, and there is said to be fresh water on the E. side, where a ship might anchor in moderate depths; at the N.W. end there is also anchorage with regular soundings towards the shore, and a fine sandy bay on the W. side, where boats may land; but no fresh water is procurable there. From the S. end of the island a reef projects to a considerable distance, which ought to be avoided in passing, particularly in the night; and beyond this reef, the **Daphne Rock** lies about 5½ m. due S. from the S. end of Little Coco; and another reef is marked about 2 m. to the N.E. of the Daphne.

Coco Channel. The channel between the Little Coco and Landfall Island, off the N. end of the N. Andaman, is about 6 leagues wide. The soundings vary from 12 to 50 fathoms; but as rocks extend from both, its navigable width between Daphne Rock and the dangers off Landfall Island is not more than 12 m.: the bank of soundings is about 5 or 6 leagues broad E. and W., the bottom mostly coral, but in some places it is sand and mud. During the N.E. monsoon the current sets frequently through this channel to the N.W.; in the S.W. monsoon it sets mostly to the E., although in fine settled weather tides prevail among these islands, the flood setting N.N.E., and the ebb S.S.W.

The GREAT ANDAMAN, generally considered as one large island, is in reality composed of three islands, separated by two narrow straits, one in about lat. 12° 55' N., and the other in 12° 3' N.; there is thought to be depth sufficient in these straits for a vessel not drawing much water, but they are too contracted to be navigated except by boats, or very small vessels.

Port Blair, the convict settlement, is near the S.E. end of the South Andaman. These three islands, including the smaller islands and shoals near them, are surrounded by a bank of soundings extending to sea-ward from 10 to 20 m. on their W., and from 4 to 10 m. on their E. side, with general depths of 30 to 50 fathoms. There are three great coral reefs on the W. side of the group: namely, the W. Coral Bank, 24 m. in length N. and S., lying from 15 to 20 m. from the North Andaman; the Middle Coral Bank, 10 m. in length, about 18 m. from the centre of the Middle Andaman; and the S. Coral Bank, about 5 m. to S. by E. of the Middle Coral; and the bank of deep soundings extends below these to the N. Centinel Island.

Landfall Island (the N. point), in lat. $13^{\circ} 40' N.$, lon. $93^{\circ} 59' E.$, bears S.W. by S., and 22 m. from Little Coco. It is 5 m. to N. of Cape Price, the passage between being 3 m. broad, but dangerous; Clough Reef lying mid-way across. Landfall Island is of level aspect, and may be seen about 6 leagues. There is off its E. point an islet called East Island, and both are encompassed by a reef, which should not be approached under 18 or 20 fathoms in any part, particularly in the night, or in thick weather. Ranger Ledge bears E. about 3 m. from East Island, and close to it on the outside lies **Jackson Ledge**, both dangerous shoals; to the S.E. of the latter, about 7 m., and nearly 3 leagues E. by S. from Cape Price, lies **Union Ledge**, in lat. $13^{\circ} 31' N.$, another dangerous shoal. Between the Andaman and these shoals the bottom is mostly rocky, with great overfalls; ships ought, therefore, to pass always outside of the shoals in deep water, for at a small distance to the E. of Jackson Ledge there are from 18 to 20 fathoms, and near Union Ledge 30 and 40 fathoms. The edge of the bank of soundings extends only about a league outside this ledge, rendering the approach to it dangerous in the night, or in thick weather.

The **North Andaman** is about 44 m. in length from N. to S., and 14 in breadth; its N. end is surrounded by a group of small islands and rocks, the principal of which is Landfall Island. **Cape Price**, in lat. $13^{\circ} 34' N.$, lon. $93^{\circ} 1' E.$, is its N. point; and at 2 m. to E.S.E. of it, stands **Pocock Islet**, to the E. by S. of which lies **Union Ledge Reef**, distant 7 m. About 7 m. to the W.S.W. of Cape Price, is Cape Thornhill, the N.W. extremity of the island, off which, at a small distance to the W., there are two islets, called White-Cliff and Reef Islands, and 3 m. to the N. of these lies **West Island**, surrounded by a reef a mile off shore.

Port Cornwallis, on the E. side of the N. Andaman, in lat. $13^{\circ} 20' N.$, lon. $93^{\circ} 7' E.$, about 16 m. to the S. of Cape Price, is an excellent bay or harbour, extending about 2 leagues into the land in a N.W. direction, and in breadth about 1 league. There are in it several small islands, of which the most conspicuous is Chatham Island, about 2 m. long; it contains also several creeks and coves. The entrance is about $\frac{1}{2}$ m. wide, with 18 fathoms in mid-channel, formed between an islet at the N. point and a reef projecting from the S. point; the depths within decrease from 12 regularly to 7 and 6 fathoms, and the least water in the harbour is 5 fathoms. To the N. of this harbour, near the shore, there is a group of islands surrounded by a reef; and Union Ledge Reef lies 7 m. to N.N.E. of them. This excellent harbour being land-locked on every side, and surrounded by lofty mountains covered with impenetrable forests, is very secure from all winds.

Ships coming from the W. with a fair wind, intending to stop at Port Cornwallis, ought to keep 4 m. from West and Landfall Islands, and at least 2 m. from the N. point of the latter; and having steered E. 9 or 10 m., they may haul to the S. and pass outside of Ranger, Jackson, and Union Ledges. In thick weather, during the S.W. monsoon, it will be prudent, after making Landfall Island, and passing to the N. of it at 3 m. off, to steer E. until out of soundings; or to keep in deep water on the outer verge of the bank, to round the ledges with safety, for Union Ledge is about 3 leagues from the shore, and not far within the edge of the bank of soundings. About 3 leagues to the S. of Port Cornwallis is **Saddle Mountain** (2,400 ft. above sea-level), the highest on these islands, and discernible at 20 leagues' distance; it appears in the form of a saddle when viewed either from the E. or W., and its N. peak is in lat. $13^{\circ} 12' N.$ **Sound Island** lies about 5 leagues to the S. of Saddle Mountain, fronting the E. entrance of Stuart Sound, having 70 and 80 fathoms very near it, and no soundings about a league off shore; the whole of the E. coast, from Saddle Mountain to lat. $12^{\circ} 36' N.$, is steep and mountainous.

The W. Coral Bank. The W. coast of the North Andaman has a bank, with various depths, stretching along it, and extending much farther out in some parts than the soundings on the E. coast. Nearly W. from Saddle Mountain, about 7 leagues from the W. side of the island, there is a part of the bank very shoal, and *probably* dangerous; depths of 4 fathoms are *said* to have been found, but 7 fathoms are marked on the chart. Between the shoal-bank and the coast the soundings vary from 40 to 20 fathoms, and 15 fathoms near the land. A ship had better avoid this part, unless she has the latest Admiralty chart.

The Middle Andaman is only separated from the North Andaman by the narrow strait called Stuart Sound. The island is about 50 m. in length N. and S., and 15 or 16 in general width.

Off its N.W. point is Interview Island, forming inside it Port Andaman; and off its S.E. part there is a group of islands and rocks separated from it by Diligent Strait.

The W. coast of Middle Andaman. Port Andaman is formed inside Interview Island, that extends from lat. $12^{\circ} 47' N.$ to $13^{\circ} 1' N.$ About 5 m. off its N. end there is a small island, with a reef projecting $2\frac{1}{2}$ m. from it towards the N. point of the former, betwixt which and the reef there is a passage. A reef projects from the S. end of Interview Island, with 14 fathoms close-to, and also within it, in the entrance of Port Andaman; and to the N. betwixt that island and the coast lie several islets and rocks; other small islands are dispersed along the coast, from Interview Island to the N.W. end of the Andaman, with soundings near them from 12 to 25 fathoms. Below Port Andaman some islets and reefs line the shore. About 6 leagues off, in lat. $12^{\circ} 31' N.$, opposite an island near the shore called Flat Island, there is a bank called the W. Coral Bank, with 4 to 7 fathoms on it, and 30 to 40 fathoms between it and the land.

The E. coast of Middle Andaman. Diligent Strait is formed between the S.E. coast of Middle Andaman and some contiguous islands, and a group or chain of larger islands off it, extending from lat. $11^{\circ} 48'$ to $12^{\circ} 20' N.$ From Oyster Bay to the N., a mid-channel course is recommended. The two islands, North and Middle Button, are always visible, and are an excellent guide to the N.E. entrance, which is $2\frac{1}{2}$ leagues wide, except towards the middle, where it is only about 2 or 3 m. in breadth betwixt the nearest islands, and where the least water found was 8 fathoms; from 17 to 25 fathoms were found in the N. part of the Strait, and in the S. part from 30 to 40 fathoms. The islands which form the E. side of this Strait are generally high, covered with wood, and connected together by reefs; a bank of soundings extends a few miles around them, and along the coast of the Andaman opposite. Sir Hugh, the S. island of this group, bears E.N.E., and is 20 m. from Port Blair. Without a good chart to recognise the islands, vessels had better avoid this Strait. At the N. part of Diligent Strait there are shoals, and reefs project from some of the islands, from 1 to $1\frac{1}{2}$ m.; the anchorage in the middle of it is good, with shelter from all winds. Opposite these islands, in lat. $12^{\circ} 24' N.$, lies the E. entrance of Middle Strait, which divides the Middle from the South Andaman. To pass through Diligent Strait from the S., keep in mid-channel; and when between Round Hill (on Henry Lawrence Island) and Strait Island, steer N.E. by N., with the E. side of Middle Button touching the W. side of N. Button; when within $1\frac{1}{2}$ m. of the Middle Button, steer out E.N.E. in mid-channel between N. Button and Outram Island.

The South Andaman is about 43 m. in length N. and S., and from 9 to 15 in width: it is separated from Middle Andaman by the narrow channel called Middle Strait, and has off its S. end several islands, the principal of which is Rutland Island. The ports in the island are, Port Meadows and Port Blair on its E. side, and Port Campbell on its W. side. Port Meadows, in lat. $12^{\circ} 0' N.$, is a small harbour with an island at its entrance, inside of which there appears to be secure anchorage in from 7 to 10 fathoms. The passage N. of the island should not be attempted; that to the S. of the island is the proper one, but is less than $\frac{1}{2}$ m. wide, and has two rocky patches in the fairway, with only 4 and $4\frac{1}{2}$ fathoms on them.

PORT BLAIR, the British India penal settlement, to be henceforth remembered as the spot where Lord Mayo, Viceroy of India, was assassinated in 1871, is a fine, land-locked harbour, but has no trade, the imports being confined to Government stores and provisions for the garrison and convicts. Ross Island, with a flag-staff at its N. end, stands at the entrance, in lat. $11^{\circ} 43' N.$, lon. $92^{\circ} 45' E.$, and $4\frac{1}{2}$ leagues from the S. end of the S. Andaman. The S. passage in mid-channel has 6 fathoms, but very confined, and the N. one has 20 to 30 fathoms; there is anchorage about 2 m. within the entrance, near Chatham or Mask Island, in 9 to 6 fathoms in the S.W. monsoon, when, in the early part of July, strong squalls and rain from that quarter were found by H. M. S. *Roebuck*. Water can be obtained opposite this island on the N. shore; no other supplies are obtainable, and a store-ship is moored off Ross Island, with supplies for the penal settlement.

Coming from the S., to avoid a shoal when within 2 m. of Ross Island, haul out to the E., and do not bring the superintendent's house to the N. of N.N.W., until Atalanta Point is well open of the S. Point. From this port to the S. the coast is bold, with various depths on the bank of soundings lining the shore. A buoy is now placed to mark the above shoal, at $1\frac{1}{2}$ m. to S. by E. of Ross Island.

Port Campbell, in lat. $11^{\circ} 59' N.$, on the W. side of the S. Andaman, is an inlet 6 m. in extent, with an islet on each side the entrance, the banks off which narrow the channel to less than $\frac{1}{2}$ m.; it widens inside, affording anchorage in depths from 10 to 12 fathoms.

Rutland Island, $3\frac{1}{2}$ leagues in length, 2 in breadth, and of considerable height, is separated from the S. end of South Andaman by the narrow Macpherson Strait. This strait is scarcely 2 cables wide at the N. point of Rutland Island, having 10 and 12 fathoms at the W. entrance,

and generally from 16 to 19 fathoms all the way through. At a small distance from the W. point of Rutland Island there are two small islands called the Twins, with a reef projecting from them a mile to the W. and S., near to which the depths vary from 12 to 22 fathoms: and off the S.E. point, there is a group called the **Cinque Islands**, moderately elevated. Between Rutland Island and these, there is a safe passage, called **Manners Strait**, with deep water in it, 45 to 60 fathoms. Along the S. side of the Island there are regular soundings, of 13 to 18 fathoms, about 2 or 3 m. off; but nearly 2 leagues to W. of the S. point, and the same distance S.W. from the Twins, there is a bank of coral rocks, with 7 fathoms on it, and probably less water. The S. end of Rutland Island is in lat. $11^{\circ} 22' N.$ To the N.W. of Rutland Island, near the shore of the South Andaman, and off the W. entrance of Macpherson Strait, are several islands, which, together with their connecting reefs, are called the **Labyrinth**. **Passage Island** (having a little islet at $\frac{1}{2}$ m. to N.), is 3 m. to S. of the Cinque Islands, and **The Sisters** are two islets standing 4 m. to S.E. of Passage Island; these form the N. side of the Duncan Passage.

The North Centinel (the centre) in lat. $11^{\circ} 34' N.$, lon. $92^{\circ} 15' E.$, and $15\frac{1}{2}$ m. W. of the Labyrinth, is a level island covered with trees, about 5 m. in extent N. and S., and seen about 6 leagues off. Shoal water, with reefs, extend around about 1 m. off shore, and two islets lie at the S. end, and one at the N.W. end. There is *said* to be fresh water upon this island. The bank of soundings extends from the W. coast of the Andaman about 4 m. from the North Centinel, with various depths on it, from 20 or 30 to 50 fathoms, the bottom sand and coral towards the shore; but in 40 and 50 fathoms it is generally ooze.

South Centinel, in lat. $11^{\circ} 2' N.$, lon. $92^{\circ} 13' E.$, bearing from N. Centinel about S., 11 leagues, and 6 leagues distant from the N.W. part of Little Andaman, is a small woody island, about a mile in extent E. and W., seen about 6 leagues. From its N.W. and S.E. ends coral reefs project about 2 cables' lengths, on which the sea breaks high in the S.W. monsoon. Abreast of the E. end of the island, about $\frac{1}{2}$ m. off, there is no ground 40 fathoms; but about half-way between it and the N.W. part of Little Andaman, there is ground 45 and 50 fathoms, decreasing to 13 and 10 fathoms within 1 or 2 m. of that shore.

The Duncan Passages are formed by the islands which lie between Rutland Island and the Little Andaman; the larger of the two is very safe and commodious. The N. passage, between Rutland and the Cinque Islands, is called **Manners Strait**. The next is between the Cinque Islands and Passage Island, 2 m. wide, with soundings from 25 to 14 fathoms. The S. extremity of the Cinque Islands is in lat. $11^{\circ} 17' N.$, from which projects shoal water off the S.W. part about a mile. Passage Island, of middling height, lies to the S. 3 or 4 m. from these, and the **Sisters** about 7 m. to the S.S.E., are in lat. $11^{\circ} 11' N.$, lon. $92^{\circ} 45' E.$

The Brothers are two small islands, lying about 2 or 3 m. N.E. and S.W. of each other; the N.E. one (called Flat Island) is 8 m. to S.W. by S. from the Sisters, and distant from the N.E. part of Little Andaman from 4 to 8 m.: they are not so high as the other islands; and they form the S. side of the Great Duncan Passage, which is 7 or 8 m. wide, and very safe by day or night, if not too dark to see the land when near, there being no danger, except a reef about a mile from the N. end of Flat Island, which, by the water breaking on it, is always visible. If it be too dark, a ship may anchor in 12 to 17 fathoms, sandy bottom, in the channel, for the depths are generally from 12 to 20 fathoms, sandy bottom, on the bank between Rutland Island and the N. end of Little Andaman. This bank projects only a few miles to the E. of the Brothers and Sisters, and 4 or 5 leagues to the W. of them, where it shelves suddenly to no ground, between the Centinels. The water-way between the Brothers has **Leeboard Ledge Reef**, and affords no safe passage for a large ship; between the S. Brother and the N.E. end of Little Andaman there is a passage, through which H. M. sloop *Ariel* went, but the **Ariel Ledge** and a reef off Little Andaman make it so narrow, it should not be entered except from necessity. The passage to the N. of the Brothers ought always to be chosen in preference.

In light breezes and fine weather, a kind of tide sets through the channels among these islands to the E. and W., but at times currents prevail, which are generally governed by the wind. In the N.E. monsoon, on both sides the islands, the current sets mostly to the S.W. or the S.; a ship running for Duncan Passage should therefore endeavour to keep a little to the N. in this season, and to the S. in the opposite monsoon, according to the prevailing wind, that she may preserve a leading breeze to pass through the channel.

The Little Andaman extends from lat. $10^{\circ} 58' N.$ to lat. $10^{\circ} 32' N.$, being 9 leagues in length N. and S., and about 5 leagues in breadth at the middle; the N. point is 16 m. E. by S. from the South Centinel. This island has an even appearance, sloping from the centre toward the sea all round, and seen 6 or 7 leagues from the deck of a large ship. Like all the other islands, it is well clothed with trees, and two small *runs* of water fall into the sea, one at the N. end, the other

in a small bay at the N.W. part. Like the Great Andaman, it is thinly inhabited, the natives depending chiefly on what fish they can procure for subsistence. It is prudent for boats landing at these islands to be on their guard; a few years back, the boat of an American ship was surprised by a shower of darts from the natives; several sailors were wounded.

Soundings along the E. and W. sides are mostly from 10 to 18 fathoms about 1 or 2 m. off, deepening about 5 or 6 m. off to 50 or 55 fathoms, then no ground; the S. side is more steep, there being no ground about 3 or 4 m. off shore, and 38 or 40 fathoms within 1 or 2 m. of it, a little to the E. of the S.W. point of the island. From this point W. by S. 5 or 6 m. distant, there is a bank of coral rocks with 5 or 6 fathoms on it, or *probably* less water, which may be avoided by keeping farther out, or between it and the S.W. sandy point of the island, in a good channel, having 13 or 14 fathoms near the sandy point, and deepening to 20 or 25 fathoms towards the coral bank.

BANKS and ISLANDS to E. of the ANDAMANS. **Invisible Bank**, so named by Captain Blair, as the water did not seem discoloured upon it, lies E. from Duncan Passage, extending N. and S. about 10 leagues, or from lat. $10^{\circ} 59'$ to $11^{\circ} 28'$ N., and is from 3 to 4 leagues in breadth. The soundings on this bank vary from 17 or 18 to 40 or 50 fathoms near its outer edges, where in deep water the ground is sometimes ooze or sand, but well in upon the bank frequently foul and rocky, particularly near the dangerous **Flat Rock**, in lat. $11^{\circ} 8'$ N., lon. $93^{\circ} 31'$ E., which bears nearly E. from the Sisters in Duncan Passage, distant 15 leagues, and is very dangerous, being sometimes *awash*, and sometimes a few feet above water, with rocky foul ground stretching out from it about twice its length, on which the sea breaks in bad weather. The lead, if kept going, will denote near approach, for soundings extend all round to a small distance, but farthest to the N. and S. At a small distance from the rock, the depths are from 13 to 20 fathoms, coral and sand; but not always regular, so it would be dangerous to approach the rock in the night or in thick weather; for at such times, when a ship is near the bank, the lead should be kept briskly going, and if soundings are obtained, she ought to tack or haul out immediately into deep water.

Barren Island (the centre), in lat. $12^{\circ} 16'$ N., lon. $93^{\circ} 50'$ E., about 70 m. N.E. by E. from Port Blair, is a volcano, but of even appearance when viewed at a distance, and seen 12 leagues, being about 800 ft. high. It is small, covered with trees, except near the crater. There is no anchorage and no landing, except in very fine weather, and as you approach the shore the water sometimes gradually gets warmer; fire-wood could be got with difficulty, but no water.

Narcondam Island, in lat. $13^{\circ} 27'$ N., lon. $94^{\circ} 16'$ E., bears about N. by E. from Barren Island, distant 70 m. When about 10 m. off Landfall Island, Narcondam was in sight from our mizen shrouds; and may be seen about 15 leagues from the deck, being not more than 2,000 ft. high, and appears a cone or pyramid with its summit broken off. Close to it on the E. side there is an islet or rock, and another at the S. point; but it is bold and safe to approach all round, and, like Barren Island, of small extent.

The Ten-Degrees Channel separates the Andamans from the Nicobars.

NICOBAR ISLANDS.

These islands, called by Malays the Sambilangs, or Nine Islands, extend N.N.W. and S.S.E. 54 leagues, having several safe channels among them: eight or nine of them are of considerable size; the others generally small. They are considered unhealthy.

Car-Nicobar, the N.-most of these islands, bears from the S.E. point of Little Andaman about S. by E., distant 78 m., its N. point being in lat. $9^{\circ} 16'$ N., lon. $92^{\circ} 46'$ E. It is about 8 m. in length N. and S., and 6 in breadth, elevated 200 ft. above sea, at the W. central part, and near the S.E. point there are small risings. The middle of the island is covered with long, rich grass, where hogs are bred; near the coast there are fruit trees of various kinds,—orange, citron, lemon, and lime trees: plantains, yams, and sweet potatoes, may be also procured; but cocoa-nuts are in great abundance, and on these all the animals are fed, there being no sort of grain. Ships from the Coromandel coast stop here at times to load with cocoa-nuts, which they receive in barter for coarse, blue cloth, or other piece goods; and with the cargo procured here they proceed to Rangoon, where they receive for it in exchange a cargo of plank for ship-building. The inhabitants of this island are usually hospitable to strangers, and inoffensive to each other. A ship having a scorbutic crew may touch here for a supply of hogs, or some refreshments, and may anchor on either side the island in from 12 to 30 fathoms, near some of the villages; but soundings do not extend far out; the bank being steep, and the bottom mostly sand, or sand and coral, makes the anchorage indifferent.

Saoui Bay, the most eligible place to anchor at, is at the N.W. end of the island, having 12 fathoms, abreast the watering-place and village, and about 1 m. off, in the N.E. monsoon. Vessels should not round the N.W. point of the island too close, but off the N.E. point the dangers seem to lie farthest off, or nearly 2 m. A large ship, for the convenience of getting refreshments, might anchor abreast the village in 12 fathoms, the N. point N.E., and the S. point W.S.W.; not less than 1 m. off shore. **Komios Bay**, on the S. side of the island, is also convenient for anchoring in 10 to 15 fathoms, during the N.E. monsoon. The channel betwixt this island and Little Andaman, generally called the Ten-Degrees Channel is 60 m. wide, and clear from danger.

Batty Malve, in lat. $8^{\circ} 49' N.$, lon. $92^{\circ} 50' E.$ bearing from the S. end of Car-Nicobar about S.S.E., $6\frac{1}{2}$ leagues, is about $1\frac{1}{2}$ m. in length E. and W., and $1\frac{1}{2}$ m. N. and S. It is destitute of water or inhabitants, being rock, covered with a thin stratum of soil, which only gives root to some shrubs and scraggy trees. At the W. end it is 150 ft. high, sloping in the form of a wedge to the E., and has, therefore, been sometimes called the Quoin. At the S.W. end, about a mile distant, there are from 25 to 35 fathoms, and 40 fathoms about $\frac{1}{2}$ m. off W. end of island.

Chowry (the S. point), in lat. $8^{\circ} 24' N.$, lon. $93^{\circ} 0' E.$, bearing S.E. by S. from Batty Malve, distant 8 leagues, is of square form, and scarcely $1\frac{1}{2}$ m. in extent. The S.E. angle consists of a large rock rising from the sea to a height above the tops of trees that grow on the island, which, excepting this rock, is low and level. Off the N.W. part of the island foul ground extends about $\frac{1}{2}$ m. Near the shore cocoa-nut trees abound, and the whole level part of the island is an orchard of tropical fruit trees, oranges, citrons, limes, &c. The natives rear also hogs and poultry, and, like those on Car-Nicobar, are generally friendly to such ships as stop at the island. Cocoa-nuts may also be procured here for the Pegu market. Soundings project 1 or 2 m. from the shore, particularly off the W. end of the island; and a coral shoal (with only 9 and 10 ft.) lies 3 m. to N.W. of Chowra. A ship may anchor in 15 to 25 fathoms, off the S. side in the N.E. monsoon. On the N.E. side there is a village, with anchorage abreast, in 20 or 30 fathoms, sandy bottom.

Teresa, extending S.W. and S.E., between lat. $8^{\circ} 12'$ and $8^{\circ} 21' N.$, is 12 m. in length, and $3\frac{1}{2}$ m. broad; at the N. end, which bears from the nearest part of Chowry S.E. by S., distant 4 m. Teresa, when viewed at a distance, appears like two islands, the land towards each end, particularly the N. part, being much higher than in the middle. Its animal and vegetable productions are the same as on Car-Nicobar, but it is less populous. There is anchorage both on the E. and W. sides of the island; on the W. side the depths are from 30 to 40 fathoms within $\frac{1}{2}$ m. or $\frac{1}{2}$ m. of shore; at the S. point, where a reef projects into the sea, it is not so steep, for a ship may anchor in 30 fathoms, coarse sand, near the S.E. point, which is in lon. $93^{\circ} 10' E.$

Bompoka, separated from the S.E. end of Teresa by a deep channel about $1\frac{1}{2}$ m. wide, is a small island, partly covered with wood. Its summit 750 ft. above sea-level, is a sharp ridge, extending N. and S. about half the length of the island, from which it slopes to the water's edge. In the channel betwixt it and Teresa there is said to be safe anchorage, in 15 or 20 fathoms under Bompoka. The S.E. end of Bompoka is in lat. $8^{\circ} 14' N.$, lon. $93^{\circ} 12' E.$

Katchall, or Tillongchool, situated to the S.E. of Teresa and Bompoka, and separated from them by a fine, safe channel, 4 leagues wide, is of triangular form, each side being about 3 leagues in extent. The N. and W. sides are moderately elevated, of level appearance; but towards the middle and S.E. part of the island the land is higher, and seen about 8 leagues. It is covered with wood, and along the N.W. side there is anchorage in 15 to 25 fathoms, coarse sand, from 1 to 2 m. off shore; but the N. side is steep, having no ground at 100 fathoms about 1 m. from it. The W. end of Katchall is in lat. $8^{\circ} 0' N.$, lon. $93^{\circ} 15' E.$ Ships may pass at discretion through any of the channels between Car-Nicobar and Katchall, all being safe.

Nancowry Island, which lies to the E. of Katchall, and to the S. of Camorta (apparently forming part of it, but with a channel and excellent harbour between), is about 4 m. in extent, of triangular form, rugged and uneven, almost covered with wood. It abounds with limestone, is thinly inhabited, and little can be procured from it excepting timber and some hogs.

Nancowry Harbour (the W. entrance), in lat. $8^{\circ} 0' N.$, lon. $93^{\circ} 27' E.$, distant from the E. side of Katchall 3 m., formed by a narrow channel that separates Nancowry Island from the S. part of Camorta, is very capacious, and will shelter a large fleet of ships from all winds. Having an entrance at each end, one to the E., another to the W., with soundings, where ships may anchor occasionally, it is very convenient; and they may enter or depart from it in every month of the year. The W. entrance, about 1 cable wide, is formed between two steep points of high land, and the depths in it are generally from 27 to 35 fathoms: outside of it a sand-bank with irregular soundings from 6 to 12 fathoms, and patches of rocky bottom, project a little way from the S.W. point of Camorta. The E. entrance, in lat. $8^{\circ} 2' N.$, lon. $93^{\circ} 32' E.$, is little wider than the W., being contracted by rocky banks, which line the shore on each side, having 12 and 14 fathoms

close to them, and from 18 to 20 fathoms in mid-channel. Outside this entrance there is less water betwixt the S. end of the Island Trinkut and the N.E. end of Nancowry; but in mid-channel never less than 7 fathoms, and generally 5 or 6 fathoms close to the rocky banks on each side. The E. entrance is preferable for going in, being rather wider, with less water; and there is safe anchorage outside the narrow part, in the space betwixt Trinkut and the S.E. side of Camorta, which is called *False Harbour*, having various depths, from 6 to 10 fathoms; but it becomes very shoal to the N., and vessels should not try to enter or depart by that N. passage.

Nancowry Harbour is separated into two parts by two points of land facing each other: the E.-most, called Cross Harbour from its form, is the smaller, and contains several shelves of rock in the S. arm, with 5 or 6 fathoms close to them: here ships might be hove down to their own guns, the water being perfectly smooth in all kinds of weather. The W., or larger part of the harbour, is a great basin, of an oblong square form, about 2 m. long and 1 broad, with a cove on the W. side, and another at the S. end. In the N.W. part there is a rocky bank, with 5 and 6 fathoms, water, on it; but the depths throughout the harbour are generally 10 or 12 fathoms near shore, and 18 or 20 fathoms in the middle, except near the W. entrance, where there are from 27 to 34 fathoms. The bottom is all soft, good holding-ground. The tide runs strong, with eddies through the W. entrance in the springs, but it is safe with a steady, fair wind, particularly when departing from the harbour. The flood sets through the harbour to the E., but with very little velocity inside; H. W. at 9½ h. on F. and C. of moon, and the tide rises 8 or 9 ft. Ships going in or out by either entrance should endeavour to keep in mid-channel between the points, with a person on the fore topsail-yard, to look out for the rocky banks that line the shores.

A few Danish or Moravian missionaries were settled here many years; the village at Cross Harbour, where they resided, was called by them Hermon. Few refreshments are got here, the land being hilly and not cultivated, although on the N. side of the harbour the soil is good, and will admit of cultivation. Water is got in wells, although it is rather scarce in the dry season. The harbour, like the islands generally, is considered unhealthy.

Camorta, or Car-morta, which forms the N. side of Nancowry Harbour, is about 15 m. in length N. and S., extending from lat. 8° 0' to lat. 8° 15' N., and is from 3 to 8 m. broad. The N. end and middle of this island are flat and not much elevated, but about the harbour it is high, particularly on the W. side, where stands the principal village at the foot of a perpendicular ridge. The *Persæus* Reef, or spit, is said to extend nearly 3 m. off the N.W. point. Several sorts of poon trees, fit for masts, are said to grow on the island; and there are places of pasturage, with a rich soil, producing yams, pine-apples, plantains, guavas; and sugar-canes are said to grow without cultivation; notwithstanding, it is thinly inhabited. About 2½ m. from the S.W. point lies the mouth of a lagoon, which extends into the island a great way, and has good anchorage at its entrance; it is called Ulala Bay. Along the W. side there are soundings near shore, and from the N.W. point projects a reef of rocks, with shoal water, about 3 m. off.

Trinkut, a low, level island, covered with betel-nut and cocoa-nut trees, about 6½ m. in length, near to and fronting the E. side of Camorta, is separated from it by a narrow channel, which (except the S. part) is shoal, and forms the first large opening in entering Nancowry Harbour from the E. There are soundings of 15 to 20 fathoms along the E. side of Trinkut at a small distance, and good anchorage in 8 or 9 fathoms at the N. end, between it and the N.E. part of Camorta.

Tillangchong, including the islets off its S. end, extends from lat. 8° 25' to 8° 35' N., being ¼ m. to 1 m. in breadth, and lies N. by E. of Camorta 14 m. distant. It is a high, oblong, rugged mountain, 450 ft. high, seen 12 leagues off, in many parts covered with trees, and inhabited only by such persons as have been banished from the other islands. The E. side is steep, but close to the islets and rocks that line its W. shore, and near those chained to its S. end, the depths are from 36 to 42 fathoms. Betwixt the latter and the N. end of Camorta, the channel is 4 leagues wide and very safe, with a bank of soundings stretching from the islets off Tillangchong to the islands Camorta and Trinkut, on which there are 42 and 45 fathoms near the former, from 40 to 65 fathoms in mid-channel, and 18 or 20 fathoms near to Camorta.

Sombreiro Channel separates Nancowry from Little Nicobar; it is bounded on the N. side by the islands Katchall and Nancowry, and by Meroe, or Passage Island, on the S. side, is very safe, and 7 leagues wide. At 4½ m. to S. from the S.E. end of Katchall there is a coral bank, with various depths; the least water found has been 9 and 10 fathoms; but both to the N. and S. of it there is no ground in the channel. H. M. S. *Trident* got one cast of soundings, about 15 fathoms, coral and sand, in lat. 7° 48½' N., lon. 93° 29' E.: but the weather was too hazy to obtain bearings of the land. Ships steering for the channel, if not certain of their latitude, should endeavour to fall in with the land on the windward side, according to the prevailing monsoon; and they may pass through without hesitation, by night as well as by day, if the weather is not too dark.

Meroe, in lat. $7^{\circ} 30' N.$, lon. $93^{\circ} 30' E.$, is a low, small island, 9 m. to the N.W. of Little Nicobar, and bears from the S.E. point of Katchall S. by E. $\frac{1}{4}$ E., distant $7\frac{1}{4}$ leagues. At 4 m. to E.S.E. from Meroe, and nearly the same distance from the N. end of Little Nicobar, there is a small island called Trak, and another close to it on the E. side, called Treis, which are surrounded by rocks. Betwixt them and Meroe the passage is safe, said to have soundings from 12 to 20 fathoms; the *Prince Regent* sailed through this passage, and had no soundings with 30 fathoms' line. Betwixt these small islands and the Nicobar, there is said to be a narrow and critical passage, with soundings from 7 to 12 fathoms, which should never be attempted.

Little Nicobar Island extends nearly N.E. and S.W. from lat. $7^{\circ} 13\frac{1}{2}'$ to $7^{\circ} 26' N.$, being about 4 leagues in length and 2 in breadth; a range of hills in the S. half, running across from E. to W., are 1000 ft. high; the island is covered with wood and steep to sea-ward: but there are soundings all round near the shore. On the N.W. side, to the N. of an island called Pulo Milu, about 1 m. off shore, there is said to be anchorage off a small bay, where there is a run of water; but although this island and the Great Nicobar are said to have many inhabitants, they are less known than those of the other islands. The natives, being shy of strangers, seldom or never venture on board of passing ships; they are, however, thought to be inoffensive, and have sometimes treated with kindness the crews of vessels shipwrecked among them.

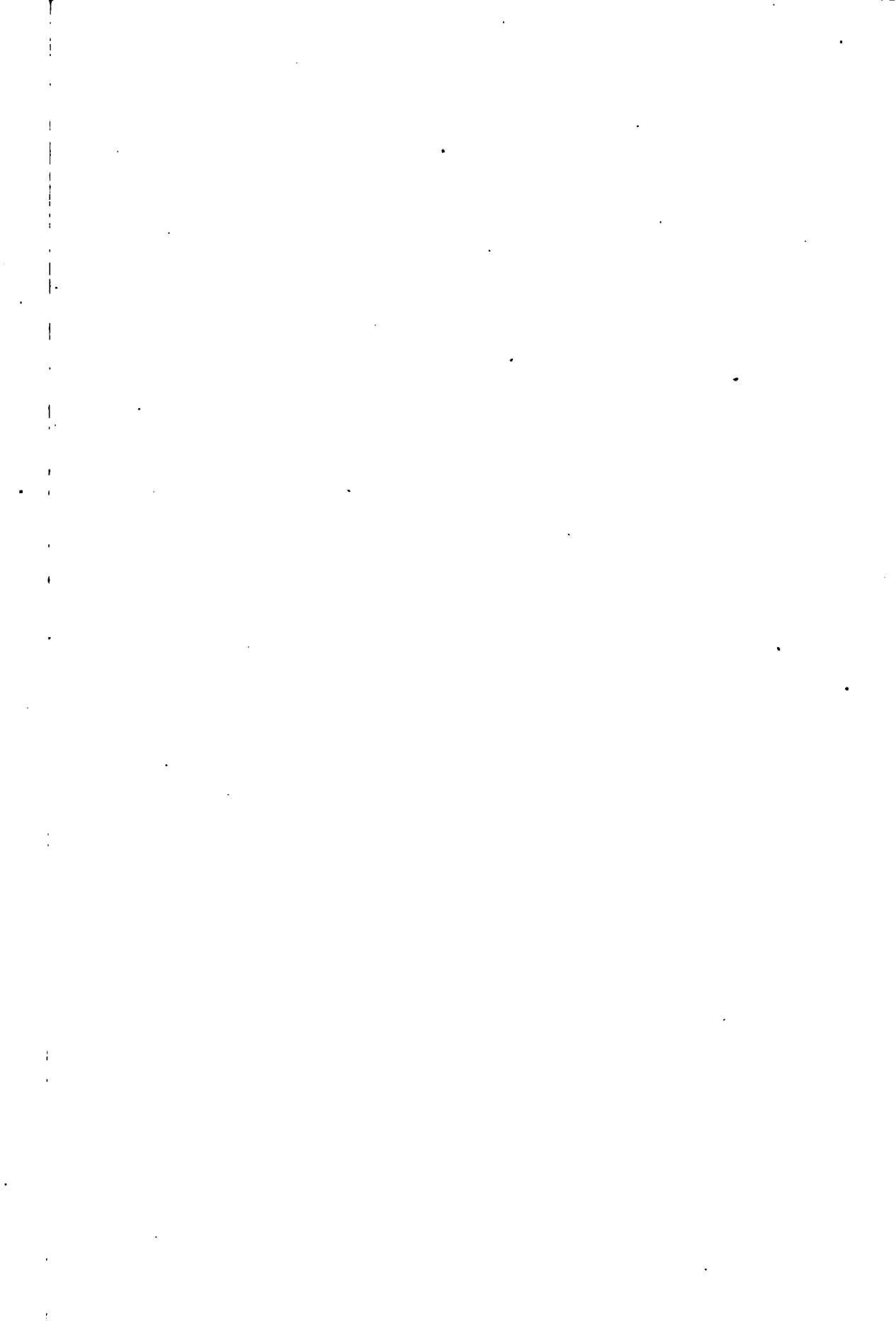
St. George Channel, formed between Great and Little Nicobar, is from 2 to 6 m. wide, and extending E.N.E. and W.S.W., $4\frac{1}{4}$ leagues in length, with deep water. The bottom in general is foul, with strong tides or currents running in eddies through the channel; therefore, of late years few ships have passed through it, unless accidentally carried into it by an unexpected current. A little inside the W. entrance is Condul Island, nearest to the S. shore, and between them there is 7 to 17 fathoms, and good anchorage in the former depth. From the N. end of the same island a reef projects considerably, betwixt which and the N. shore is the proper channel, about $1\frac{1}{4}$ m. wide; and ships that intend to proceed through should keep nearest to the N. side, or Little Nicobar shore, where there are said to be soundings, but none in mid-channel. The rocky bottom, deep water, and strong eddies, will, however, always make it imprudent to anchor, except to the W. of Condul Island, where the depths are moderate. On the S. side of the E. entrance, off the N.E. end of Great Nicobar, is the small island **Cabra**, of middling height; and on the N. side, the island Montchall, near the E. end of Little Nicobar. The entrance into the channel is between these two small islands.

Great Nicobar Island, or Sambelong, extends N. by E. and S. by W., about 10 leagues in length, and is 3 or 4 leagues broad at the N. part and mid-island, where the land is high, and may be discerned 11 or 12 leagues off. The S. part becomes narrow, projecting in a low, level point, which is about $1\frac{1}{4}$ or 2 m. broad, covered with trees, and having a sandy beach facing the sea. This S. point is in lat. $6^{\circ} 45' N.$, lon. $93^{\circ} 48' E.$, and to the E., between it and another point, a bay is formed, called Galatea or South Bay, a safe anchorage in the N.E. monsoon in 9 or 10 fathoms, water.

The highest part of this Island, 2,000 ft. high, is the N.E. part, in lat. $7^{\circ} 8' N.$, lon. $93^{\circ} 47' E.$, and from this a range of hills crosses the Island to W. by S.; the highest central part (1,300 ft.) is in lat. $7^{\circ} 0' N.$, lon. $93^{\circ} 43' E.$, and mostly the whole of the island is covered with trees. There are two or three islets and small bays along the E. side of Great Nicobar, but they are unexamined. **Boat Rock**, 2 m. off the E. shore, is in lat. $6^{\circ} 58' N.$

Soundings from 17 to 24 fathoms extend along the W. coast about 2 or 3 m. off shore; from the S.W. side the bank projects about 2 leagues or more, the depths on it being from 25 to 30 fathoms about 5 or 6 m. from shore. From the S. point a reef projects about 1 m. into the sea, and lines the W. shore with soundings near it of moderate depths.

The S. point of Great Nicobar is in lat. $6^{\circ} 45' N.$, lon. $93^{\circ} 48' E.$, and 95 m. to N.W. of Pulo Brasse, off Acheen Head, the N.W. corner of Sumatra.



INDIAN OCEAN
DURING
APRIL, MAY AND JUNE,
OR THE
FIRST HALF OF AUSTRAL WINTER.

TRACKS
Outward Bound _____
Homeward Bound -----
SYMBOLS ARE EXPLAINED IN CHAPTER XX.

The Vertical Sun's mid-monthly position.

Remark.
The double & treble pack-lines show the backing down of the S.W. Monsoon, or its South limits in May (second month), and June (third month).

From Europe to India & China.
To Sunda
Icebergs & loose ice may be fallen in with to the south of this line.

INDIAN OCEAN
DURING
APRIL, MAY AND JUNE,
OR THE
FIRST HALF OF AUSTRAL WINTER.

TRACKS
Outward Bound. ———
Homeward Bound. - - - - -
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The Vertical Sun's mid-monthly position.

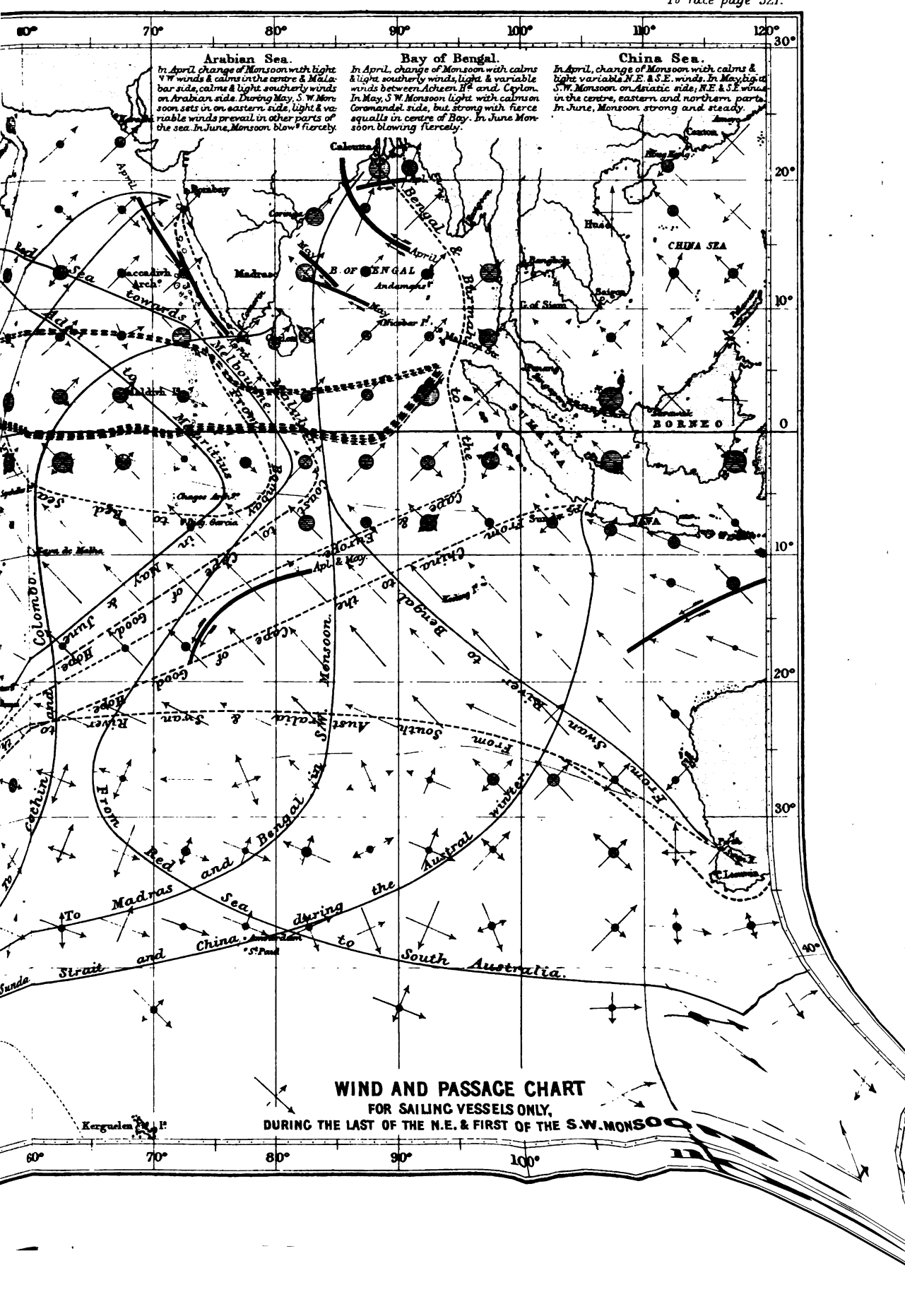
Remark.
The double & treble pack-lines show the backing down of the S.W. Monsoon, or its South limits in May (second month), and June (third month).

From Europe to India & China.

To Sunda

Icebergs & loose ice may be fallen in with to the south of this line.

P. Edward P.



Arabian Sea.
In April, change of Monsoon with light V.W. winds & calms in the centre & Malabar side, calms & light, southerly winds on Arabian side. During May, S.W. Monsoon sets in on eastern side, light & variable winds prevail in other parts of the sea. In June, Monsoon blow^s fiercely.

Bay of Bengal.
In April, change of Monsoon with calms & light southerly winds, light & variable winds between Achener, If^e and Ceylon. In May, S.W. Monsoon light with calm on Coromandel side, but strong with fierce squalls in centre of Bay. In June Monsoon blowing fiercely.

China Sea.
In April, change of Monsoon with calms & light variable N.E. & S.E. winds. In May light S.W. Monsoon on Asiatic side, N.E. & S.E. winds in the centre, eastern and northern parts. In June, Monsoon strong and steady.

WIND AND PASSAGE CHART
FOR SAILING VESSELS ONLY,
DURING THE LAST OF THE N.E. & FIRST OF THE S.W. MONSOON

SECTION V.

ISLANDS OF THE INDIAN OCEAN, AND PASSAGES TO INDIA.

CHAPTER XVII.

CAPE OF GOOD HOPE TO BRITISH INDIA.

PRINCE EDWARD ISLAND—KERGUELEN—ST. PAUL—RODRIGUES—MAURITIUS—REUNION—MADAGASCAR
E. COAST—FORT DAUPHIN—TAMATAVE—CAPE AMBRE—CARGADOS GARAJOS ISLAND—SAYA DE
MALHA BANK—GALEGA ISLAND—FARQUHAR ISLANDS—COSMOLEDO GROUP—GLORIOSO—ALDABRA
—SEYCHELLES—AMIRANTE ISLANDS—MOZAMBIQUE CHANNEL—EUROPA ISLAND—MADAGASCAR
W. COAST—JOAO DA NOVA—CAPE ST. ANDREW—RADAMA ISLANDS—NOS BEH—CAPE ST. SEBAS-
TIAN—GLORIOSO ISLES—MAYOTTA—JOHANNA—COMORO—BANK OF ST. LAZARUS.

(VARIATION OF COMPASS, FROM AGULHAS TO KERGUELEN, 80° W.; FROM MADAGASCAR S. POINT TO
ST. PAUL'S ISLAND, 20° W.; AT MAURITIUS, 10° W.; FROM SEYCHELLES TO SWAN RIVER,
AUSTRALIA, 5° W.)

Bouvet Island, in lat. 54° 20' S., lon. 5° 24' E.; together with **Thompson Island** (discovered by the *Sprightly*, Captain George Norris, with the *Lively* in company), in lat. 53° 56' S., and bearing from Bouvet Island N.N.E., distant about 15 leagues; and also **Lindsay Island** to the W. of Bouvet, are quite out of the track of sailing vessels bound round the Cape of Good Hope into the Indian Ocean. In Dec. and Jan., the *Sprightly* and *Lively* experienced very stormy weather in the neighbourhood of these islands. Although the wind was moderate at times, with a glimpse of clear sky, yet the fogs and strong gales came on so suddenly as to prevent a boat being sent from the vessels with safety, and Bouvet Island was usually enveloped in fog clouds. Almost constant hard gales prevailed from the W., with a high sea, and the current setting to the E., by which the vessels were often driven from the island; and their danger was increased by numerous icebergs and loose pieces of ice, with which they were almost daily embarrassed.

Prince Edward Islands were named by Captain Cook, who passed through the channel between them, and found it 5 or 6 leagues broad, and very safe. These two islands are high, and were then covered about with snow. The largest, or W. island, now called **Marion** (after the first discoverer in 1772), was thought to be about 15 leagues in circuit, the N. point of it being in lat. 46° 46' S., lon. 37° 37' E. Long lines of sea-weed were seen stretching 1 league off the E. cape; penguins and other sea birds were plentiful. The N.E. island, or Prince Edward, is 5 leagues to N.E. of Marion; its N. extreme being in lat. 46° 36' S., lon. 37° 57' E., and about 9 leagues in circuit. In Cave Bay, on its E. side, the sealers generally anchor. These islands afford no place

of *safe* anchorage, although they are sometimes visited by English or American vessels employed in the seal-fishery: but seals here are very scarce.

Crozet Islands, five in number, discovered by the French navigators, Marion du Fresne and Crozet, are said to lie from 9° to 12° to the E. of Prince Edward Islands, and nearly in their parallel. The *Princess of Wales* schooner, of London, whilst sealing here, near Possession Island, the largest of the group, was driven on the rocks by a heavy swell, and wrecked, and her crew, consisting of fourteen persons, remained on these barren islands nearly two years, when the *Philo*, an American schooner, on a sealing and trading voyage, fortunately touched here, and took them from a state of severe suffering, which they had endured nearly two years. Mr. C. M. Goodridge, who belonged to the schooner when she was wrecked, published a narrative of their misfortunes. Sir J. Ross, in 1840, made the S.E. point of **Possession Island**, in lat. $46^{\circ} 28'$ S., lon. $51^{\circ} 54'$ E. The two smallest, **Apostle Islands** and **Penguin**, bearing one E.N.E., and the other S. from **Hog Island**, are 30 m. from each other, and not above 6 or 8 m. in circuit. The largest is about 25 m. in circumference, distant about 30 m. from one of the smallest islands, and about 12 m. from the other; these three islands forming an irregular triangle. The E.-most of Crozet Islands is only about 3 leagues in circuit, but its peaks are nearly 4,000 ft. high; it lies nearly 5 leagues to E.S.E. of Possession, and the body of this E. island is about in lat. $46^{\circ} 26'$ S., lon. $52^{\circ} 15'$ E. **Hog Island** is said to be the W.-most, bearing (by compass) N.W. nearly 15 leagues from Possession Island, in lat. $46^{\circ} 10'$ S., lon. $50^{\circ} 28'$ E. There was said to be a reef of rocks 4 or 5 m. leeward or E. of the largest of the islands, particularly dangerous, as vessels would naturally look for shelter on that side of the Island. These and Prince Edward Islands have been sometimes visited by the Southern fishers, in search of seals or sea-elephants; but as they are destitute of any harbour or place of shelter, the landing difficult, and the weather often tempestuous, they are not now frequented by sealing-vessels.

Kerguelen Island, discovered by the French navigator of this name, and called **Desolation** by Captain Cook, is the largest island in this part of the Southern Ocean; it was frequented by English and American fishers, several of whom used to remain many months there, preparing seal-skins and oil, which they collected from the numerous herds of seals and sea-elephants that basked on the shores; but these animals are now very scarce, having been nearly exterminated. Cape Louis, the W. extremity, is in lat. $49^{\circ} 4'$ S., lon. $68^{\circ} 18'$ E.; Cape Sandwich, or Digby, the E. point, in lat. $49^{\circ} 26'$ S., lon. $70^{\circ} 35'$ E.; Cape George, the S. extremity, in about lat. $49^{\circ} 59'$ S., lon. $70^{\circ} 2'$ E.; and Cape Frangaise, the N. promontory of the island, is in lat. $48^{\circ} 40'$ S., lon. $69^{\circ} 5'$ E. This last cape forms the N. side of **Christmas Harbour**, which has 45 fathoms water, at the entrance, 16 fathoms farther in, and near the bottom of it good anchorage, in 8 fathoms, black sand, where ships are sheltered from all winds, the harbour being only open to two points of the compass. The S. point terminates in a high rock, which has an arched passage through it, and which is a good mark for distinguishing this harbour. There are several bays, particularly on the E. coast of Kerguelen Island, with many rocky shoals and islets, which render the approach to the shore dangerous in some places. At a small distance from the N.W. extremity, lies a group of islets, the N.-most of which, called Bligh's Cap, is a high, barren rock, in lat. $48^{\circ} 28'$ S., lon. $68^{\circ} 44'$ E. The tides here are considerable. Variation about 81° W.

Heard, or M'Donald Islands, were discovered, in 1854, by Captain M'Donald, of the merchant ship *Samarang*, bound to Sydney, Australia. They consist of three islands,—Meyer, the W.-most, lies in about lat. 53° S., lon. $72^{\circ} 10'$ E.; the others were called M'Donald and Young. The E.-most, Young Island, is in lat. $53^{\circ} 15'$ S., lon. $73^{\circ} 50'$ E. Variation 37° W. in 1863. Meyer Island bears, by compass, about S. $\frac{1}{4}$ W., 63 leagues from the S.E. part of Kerguelen Island. Their extent is 23 or 24 leagues, in a S.S.E. direction; the high land was covered with snow, the highest peak enveloped with clouds. Captain Rogers, of the ship *Corinthian*, discovered in 1855 a small creek in lat. 53° S., lon. $72^{\circ} 31'$ E., where a number of sea-elephants and leopards were seen, enough to fill 100,000 barrels of oil; he made M'Donald Island in lat. 53° S., lon. $72^{\circ} 35'$ E. Until further information is obtained, caution is necessary when navigating in the vicinity of this group.

ST. PAUL is the S.-most of two islands situated nearly on the same meridian; the Dutch navigator, Vlaming, who examined these islands, called the N. one Amsterdam, and the other S. Paul, which is better known and more accessible than the former, and seen about 20 leagues in clear weather. It extends about 6 m. N.N.W. and S.S.E., and is about 3 m. in breadth, having a level aspect, and sloping down at each extremity when bearing to the N.E. On the E. side of the island there is an inlet to a circular basin or crater lake, through which the sea ebbs and flows over a causeway at its entrance, nearly dry at L. W. A headland appears on each side the entrance, and **Nine-pin Rock**, 80 or 90 ft. high, stands at small distance from the shore on the N. side, in

lat. $88^{\circ} 43' S.$, lon. $77^{\circ} 34' E.$ The highest peak is 850 ft. high. The basin is said to abound with fish, and there are hot springs in its neighbourhood. The instant the fish are caught, they should be gutted and salted; for if exposed to rain before they are salted and packed, they will perish. The entrance into the basin is about 25 yards wide, formed by two narrow causeways, or ridges of rocks that run out from two peaks, which terminate the sides of the crater, one on each side; that on the right is 840 ft. high, and at its foot, on the causeway, there is a hot spring, where the thermometer stood at 196° , at which were boiled some fish; and all the springs round the water's edge are nearly as hot. From the ship at anchor, fire was seen to issue from various crevices on the island during the night, it being fraught with subterranean fire. From almost all points of the island breakers project about $\frac{1}{4}$ m. into the sea. The tide rises about 3 ft., H. W. at F. and C. of the moon about 11 o'clock.

Sealers who have resided on this island state the weather to be fine in summer, but stormy in winter, whirlwinds sometimes tearing the water from the surface of the crater. Torrents of rain, which burst over the hills pour down and form ravines in them. Two or three Frenchmen reside at the island, to take care of boats left by whalers, who visit St. Paul's once a year.

Her Majesty's steamer *Megara*, Captain Thrupp, was obliged to be beached and abandoned here on June 19th, 1871; but all the crew were taken away on Sept. 5th. During that interval they subsisted on provisions got out of the steamer, supplemented by plenty of fish and few goats, vegetables and mushrooms found on the island. To prevent scurvy, in place of ordinary vegetables, grass (which was plentiful), the leaves of the wild plantain, and a kind of dandelion, were boiled down and eaten with the other food. They had no scarcity of water for 350 men, managing to bring it down from the hills through 800 ft. of the steamer's pump-hose.

Anchorage. Abreast of the basin there is good anchorage in 21 or 23 fathoms, black sand, like wet gunpowder, about a mile from the shore, where ships are sheltered from W. winds. This is the only safe anchorage; in other parts the bottom is rocky, with deep water near the shore. In the month of June, the *Megara* experienced boisterous weather, and lost three anchors in the two days previous to being run aground. Sheer necessity alone should induce a vessel to go there in the winter months.

A vessel should lie in a good berth to clear the island on either side; and at the appearance of blowing weather from the E., put to sea immediately, and run to leeward of the island, where smooth water will be found; and as the E. wind is never of long continuance, she would soon regain the anchorage. There is not a shrub on the island, coarse grass and reeds being the only verdure seen: a sort of turf, composed of the decayed fibres of the grass and reeds, burnt very well. The *Hindustan* anchored here, when bound out with the embassy to China.

AMSTERDAM ISLAND, situated on the same meridian as St. Paul, distant about 13 leagues from it, lies in lat. $37^{\circ} 52' S.$, lon. $77^{\circ} 35' E.$; being about 12 m. in circuit, and is 2,760 ft. high: it may be discerned 18 or 20 leagues in clear weather. Vlaming, the Dutch navigator, anchored in 16 fathoms, black sand, on a spot about a cannon-shot from the shore, at the S. part of the island; they landed, but found no water, and the bushes and rushes on this side made it difficult to penetrate into the interior. The *Mors* sent her boat on shore: part of the crew landed with difficulty, and found the island covered with high grass and shrubs, but very little water could be discovered. Admiral D'Entrecasteaux, in passing this island in March, observed some little rivulets on the S.E. side, and it was thought that the sloping of the mountains here would afford an easy landing in favourable weather. Captain Wickham visited this island in 1837, and places the highest part in lat. $37^{\circ} 53' S.$, and lon. $77^{\circ} 35' E.$ The Austrian frigate *Novara* found no landing-place on the E. side, but some men succeeded in scrambling ashore on the S.E. side at a smooth spot between two reefs. Strong Westerly gales prevail near these islands in the winter months, with thick hazy weather, rendering caution necessary when they are approached. Although patches of sea-weed extend to a considerable distance from them, yet these are not always observed in coming from the W., particularly when the winds blow from this direction.

REPORTED BUT DOUBTFUL SHOALS.

When in the vicinity of the several shoals which have been reported as existing to the S. and the E. of Cape of Good Hope, the careful mariner will use discretion in sounding. Her Majesty's ship *Heron* searched unsuccessfully for Telemaque Rock in about lat. $38^{\circ} 10'$ to $38^{\circ} 20' S.$, and lon. 18° to $22' E.$: after that the *Golden Fleece*, in 1863, is said to have seen it in lat. $36^{\circ} S.$, lon. $17\frac{1}{4}^{\circ} E.$; thus are we kept in uncertainty, and for the most part because a cast of the lead is neglected. Many of the doubtful dangers of years gone by are now expunged from the charts; but new ones are occasionally reported. Potter Shoal, in lat. $39^{\circ} 52' S.$, lon. $35^{\circ} 13' E.$,—supposed

to have been seen by the American ship *Hudson* in 1864, as heavy breakers with a rock 10 ft. high—is one of the latest alarms. Captain Pullen in H. M. S. *Cyclops*, did good service in 1857, in sounding over the positions assigned to the Brunswick and Atalanta Shoals, with more than 1,000 fathoms of line; the *Cyclops* also steamed over the positions of George Island and Rose Galley Rocks, sounding with a line of more than 2,000 fathoms. Captain Pullen and other able navigators have several times observed indications of shoal water and breakers (similar to those reported as *seen* by so many seamen off the Cape and in the Indian Ocean); but they took the trouble to approach them, and take casts of the lead; in all cases satisfying themselves that there was no cause for alarm.

RODRIGUE, MAURITIUS, AND REUNION ISLANDS.

RODRIGUE (the central peak), in lat. $19^{\circ} 41' S.$, lon. $63^{\circ} 25' E.$, extends E. and W. about 15 m., and is about 6 or 7 in breadth from N. to S.: it is high, uneven land, seen 12 or 14 leagues in clear weather. Reefs and shoals encompass it, extending 3 to 5 m. from the shore,* except at the N.E. part of the island, where it is bold, having within $\frac{1}{4}$ m. of the shore 16 and 18 fathoms: from this depth, in standing to the N., it increases to 25, 30, 40, and 45 fathoms, 3 m. from shore, then no ground; farther W., the soundings are more gradual. Several islets are situated on the outer reef off the N., the W., and the S. sides.

Flat Island, the S.-most, in lat. $19^{\circ} 50' S.$, lon. $63^{\circ} 20' E.$, is about $\frac{1}{4}$ m. within the reefs, and there is said to be anchorage inside, but the entrance (4 m. to E. of Flat Island) is not surveyed.

Cape St. Francis, the S.E. point of Rodrigues, is bold land, in lat. $19^{\circ} 45' S.$, lon. $63^{\circ} 33' E.$

Mathurin Bay, is on N. side, and near middle of island; and bearing S. from the road, there is a remarkable peak, which answers as a guide. You may stand in shore to 16 or 18 fathoms, but the bottom in general is coral rocks, though in some spots sand and mud. There is a small level spot of land between two hills, with some houses, where a resident and some soldiers were usually stationed. An extensive shoal, called Middle Ground, fronts the harbour, on some parts of which there are 3, 2, and $1\frac{1}{4}$ fathoms, with gaps of 6, 7, or 8 fathoms between the shoal patches. The harbour is in general good holding-ground, the bottom being a mixture of sand and mud. There are two channels for entering or leaving; the E. one, being only about 250 yards in breadth, is intricate for large ships. The W. or leeward channel is free from danger, being about $\frac{1}{4}$ m. in breadth, formed by a small shoal of $2\frac{1}{4}$ fathoms on the edge of the Middle Ground, and a rocky patch of $3\frac{1}{4}$ fathoms to the W.; this channel being far to leeward, should only be used by steamers, or by ships going out of harbour. Sailing-ships should always go in by the E., and out by the W. channel. The island is under the Government of Mauritius.

Tides. The tide rises about 6 ft., H. W. at $1\frac{1}{4}$ h. on F. and C. of the moon: the flood runs to the E., and the ebb to the W., about 2 m. per hour. Variation $7\frac{1}{4}^{\circ} W.$

The E. Channel. A ship, having made the E. or N.E. part of island, may stand in within $1\frac{1}{4}$ m. of the reef, and coast along until Booby Island is seen, which bring to bear W. $\frac{1}{4}$ S., and steer towards it till the Peak (which will bear about S.S.W. $\frac{1}{4}$ W., when first seen) bears S. by W. $\frac{1}{4}$ W., or about two ships' lengths open to the E. of the White Rock;† then Diamond Island will be just touching Diamond Point, and you will be at the entrance of the channel. Steer in W. by S. $\frac{1}{4}$ S., until the Peak and White Rock are in one (observing not to open Diamond Island with the Point), then haul up about S.W., keeping a good look-out on the port bow for a $2\frac{1}{4}$ -fathom shoal, which is generally visible; and when Diamond Island is open with Diamond Point, you are within the shoals, and may run down to the W., and anchor in 12 or $12\frac{1}{4}$ fathoms, sand and mud, with the Peak bearing from S. $\frac{1}{4}$ W. to S. $\frac{1}{4}$ E., and Diamond Island between two nob's or hummocks,‡ near the point; the most convenient berth for watering.

The W. Channel. A ship leaving the anchorage should use the W. Channel, and get her head round to W.N.W., and run down on that course till the Peak bears S. by E. nearly, then haul up N. by W. or N. $\frac{1}{4}$ W. (observing how the tide sets you, so as to keep the Peak bearing S. by E.), and when the N.E. point of island is open with the E. point of the bay, you are clear of all the shoals, and will have 16 or 17 fathoms, water. A rocky patch, of $3\frac{1}{4}$ fathoms, has been discovered nearly in the middle of the W. Channel: there was a *buoy* placed on it. The Peak, just open to the W. of the large house, leads a ship between the Rocky Patch and Middle Ground.

* Three vessels were lost on the reef off the S.W. point of Rodrigues, all their captains stated they were 12 or 15 m. from the island; but a survey by H. M. S. *Isis* showed that the reefs do not extend 9 m. off.

† A rock close to the shore, *whitened* to make it conspicuous; but this, it is said, is sometimes neglected.

‡ See Views A and B, in Lieutenant Grubb's Plan of the Bay. We hope to have soon a better survey; and that a light-house may be erected at the island.

In sailing into or out of this harbour, a good look-out from the fore-topsail yard is advisable, for the shoal coral reefs may often be easily seen when the water is clear: a boat ahead is also a necessary precaution for those who are unacquainted. The soundings decrease regularly from 30 fathoms 2 or 3 m. off, to 8 or 9 fathoms within a cable's length of the reef. These directions are very old; and H. M. S. *Conway*, in 1844, preferred to anchor outside.

A ship can touch at this place in want of fresh water, there being plenty in the harbour, and also wood for fuel. Fish may be caught in abundance, but some are of a poisonous* quality; which (some people think) is confined to those caught in deep water, with hook and line; whereas, those got by the net or seine, in shore, were good and wholesome.

Winds. At Rodrigue the trade-wind blows more constantly than at Mauritius or Bourbon, prevailing between E. and S.E. the greatest part of the year; the weather is sometimes cloudy, with showers of rain when the wind is strong; but more frequently hazy and dry, with a moderate trade. The stormy months here are Jan., Feb., and March, and also Nov. and Dec. The current throughout the S.E. trade generally sets with the wind to the W., from 5 to 15 m. daily, but at times it runs to the E., in opposition to the wind.

Hurricanes are liable to happen here, from the beginning of Nov. till the end of March, and in some years there are two, but generally only one, and sometimes none: they blow with great violence, commencing from the S., and backing round to E., then N.E. and N.W., where they gradually decrease after continuing about thirty-six hours. When at anchor in the harbour, the approach of these hurricanes may be known, without the assistance of a barometer, by the darkness of the atmosphere, the rising of the water above its usual level, and the hollow roaring of the breakers on the reef and shoals; and they generally give about twenty-four hours' warning. The hurricanes sometimes extend far to the E. in the S.E. trade, or nearly to the coast of Australia.

In March, 1809, the homeward-bound fleet from Madras and Ceylon, in lat. 28° S., lon. 62° 40' E., had a violent gale, commencing at S.E., increasing on the 15th from the E. with constant rain, then moderated without veering round the compass. In this gale the *Bengal*, *Calcutta*, *Lady Jane Dundas*, and *Duchess of Gordon*, four of the India regular well-built ships, foundered with all their crews; and it is remarkable, that the *Earl St. Vincent* and some other ships of this fleet, suffered no damage in the gale, nor even appeared to have considered it as very tempestuous, although their distance from the ships that perished could not be great, so partial are these tempests in their local range. In Feb., 1828, in lat. 30° S., lon. 46° E., the *Buckinghamshire* encountered a hurricane from the E., which afterwards changed to N.W., and blew equally strong. The barometer fell previously, and gave sufficient warning, it being at 28.90 during the height of the tempest, the sympiesometer then at 28 in. Both commenced rising two hours before the wind abated.

MAURITIUS, or **ISLE OF FRANCE**, about 100 leagues to the W. of Rodrigue, is mountainous, and seen 16 or 18 leagues in clear weather; but seldom at a great distance, the summits of the mountains being frequently enveloped in clouds. This island extends in a N.N.E. and S.S.W. direction, **Cape Brabant**, the S.W. point, being in lat. 20° 28' S., lon. 57° 19' E. The cliffs on the W. coast, to the S. of Port Louis, are of considerable elevation, and below them to this S.W. cape, coral reefs fringe the shore. Cape Brabant is a steep bluff, the summit of whose headland, called Le Morne Brabant, is a lofty and good land-mark to steamers approaching from the Cape of Good Hope, but sailing-ships approach Mauritius on its windward or E. side, where Grand Port *fixed* light, and Flat Island *revolving* light, now make the land-fall very easy.

The **W. Coast** above Cape Brabant, goes about N.E. by N. for 15 m. to steep cliffs, that form the S. point of La Petite Riviere Bay; thence N.E. by E. for about 4 m. to Sandy Point (*Pointe aux Sables*), from which the floating light-vessel at Port Louis bears E.N.E. about 3 m. off. When off La Petite Riviere in clear weather, a vessel ought to see (from aloft) the bright periods of Flat Island *revolving* light, which is 25 m. to the N.E.

Coming from the W., vessels may steer for Port Louis Light-vessel, when it bears to the E. of E. by N. $\frac{1}{4}$ N.; and at night may anchor about $\frac{1}{4}$ m. to W. by N. of the light; they should not drop anchor within 3 cables of the light, for fear of hooking her moorings. The depths at this anchorage vary from 12 to 20 fathoms.

PORT LOUIS, the capital of Mauritius, is on the W. side of the island, about half-way between Flat Island and Cape Brabant, or about 15 m. to S.W. of Cannonier Point Light. The city and dockyard are situated about $1\frac{1}{4}$ m. up an inlet running S.E. into the land between coral

* Abbe Rochon states that several kinds of poisonous fish are found on the coast of Madagascar, which are discovered by placing a piece of silver under their tongue; for it loses colour and turns black when the fish are noxious. He also mentions that the squadron of the late Admiral Boscawen suffered a considerable loss at Rodrigue, from having neglected this precaution.

reefs; the channel is marked by buoys. Behind the city stand magnificent mountains; the *Pouce*, or Thumb, 2,840 ft. above sea, is about 3 m. to S.E.; Peter Botte (2,500 ft.), is $1\frac{1}{4}$ m. farther E. Port Louis has a sailor's home, and three or four good, dry docks, one of which will take a ship 360 ft. long. All kinds of stores and coal are procurable. Extensive fortifications protect the entrance of the port; and it has a Harbour Master, who berths all vessels, and gives warning of the approach of hurricanes or bad weather.

Sailing Directions for Port Louis. Ships, whether from Europe, or Bengal and China, must make their land-fall at the S.E. side of Mauritius. Great care is requisite when running in with the E. part of island at night, as dangerous reefs project from several places nearly a league into the sea, but Grand Port Light will guide you till Flat Island Light is seen. A vessel from the S., bound to Port Louis round the N. end of Mauritius, having sighted Grand Port Light, should keep it well on the port bow, remembering that the reefs to the N. of that place extend some 7 m. to N.E. by E. from the light. Therefore, when it bears W.S.W., a vessel ought to be fully 8 m. from the light, and should steer to N.N.E. till sure of being well clear of the E. shore, or till Flat Island *revolving* light is sighted, bearing about N.N.W.; but that light must not be steered for *direct*, till bearing to W. of N.N.W. $\frac{1}{4}$ W. The lead if properly attended to by a vessel off Grand Port Reefs, will be a tolerable guide in thick weather.

When a ship approaches the N.E. part, in lat. 20° S., four small islands will be seen by day off the N.E. part of the main land. The channel generally used in sailing to the N.W. port, is between the inner island, called Gunner's Quoin, and others farther from shore. Round Island, 1,040 ft. high, is the most remarkable, and lies about 4 leagues off, in lat. $19^{\circ} 50\frac{1}{4}'$ S., lon. $57^{\circ} 50'$ E., being about 1 m. in length; it is high, appearing like a haycock, and seen 10 or 12 leagues. A ship coming from the E., in the latitude of Round Island, will discover it sooner than the main land, especially in cloudy weather, or when the horizon is hazy, by day. By night the good *revolving* light on Flat Island may be seen sometimes 25 m., or 15 m. to N. and E. of Round Island. In approaching Round Island, a large barren islet or rock is perceived; this is called Serpent Island, and lies N.E. $1\frac{1}{4}$ m. from the former, with foul ground between them. If a ship pass outside of all islands, with the wind far to S., she will have to work in afterwards; it is, therefore, proper to pass to the S. of Round Island and Flat Island, keeping more than half a league from them, to give a berth to the reefs off the former, and off Gabriel Islet, which is 2 m. to S.E. of Flat Island Light. Between Serpent and Round Island, breakers are visible, even in fine weather. N.W. by W. $\frac{3}{4}$ m. from Round Island, is a dangerous shoal, as it never uncovers, and has currents strong and uncertain near it.

Flat Island is situated $3\frac{1}{4}$ m. N.E. by N. from the Gunner's Quoin (or Coin de Mire), and about 7 m. W. from Round Island. The greatest part of Flat Island is very low land: it is cut in two by a small arm of the sea, and close on the N. side there is a large rock, resembling a tower, called Le Colombier, or the Pigeon House, which seems separated from Flat Island, though joined to it by a ridge of rocks even with the water's edge. The only part of Flat Island that is high is the W. end, which is 360 ft. high, and there a light-house has been built. On this Island also is situated the Cholera Hospital.

LIGHTS. Flat Island, S.W. part, in lat. $19^{\circ} 52\frac{1}{4}'$ S., lon. $57^{\circ} 39'$ E., has a *revolving* light, bright for 40, and dark for 20 seconds: it is 370 ft. above H. W., and visible about 8 leagues.

Cannonier Point Light, in lat. $20^{\circ} 0'$ S., lon. $57^{\circ} 32'$ E., about 10 m. to S.W. of Flat Island, is a *fixed* light, only 33 ft. above sea, visible 10 m. off. When seen from the S. on any bearing to the N. of N.E. $\frac{1}{4}$ E., the light will appear *red*, thereby warning the mariner (when within 6 m. of the light) that he is too near the land.

Port Louis Light-vessel, in lat. $20^{\circ} 8'$ S., lon. $57^{\circ} 29'$ E., placed in 15 fathoms, to N.W. of the Bell Buoy, to N. of the harbour, exhibits a light *flashing* every half minute, elevated 34 ft., visible about 9 m. off.

Notice. In the event of its being necessary to take away this light-vessel for repairs, or should she be absent from her station for any other cause, a vessel will be anchored on the spot where she now lies, and will be distinguished as follows:—During the day, two flags (white, with blue cross), and a ball below each, on two separate masts. During night, two signal lamps, one on each mast (at the same elevation); and a blue light, or a flare-up light every half-hour.

Tonnellier Island Light. This was a small *green* harbour-light, shown from a flag-staff at the W. angle of Fort Tonnellier, about 1 m. to N.W. of the city. But it is not now noticed in the Admiralty List of Lights.

Tides. Among these islands the currents set strong for about an hour at a time, often at the rate of 3 m. an hour. The flood sets N.W. and sometimes W.; the ebb to the S.E. and E., and they ought to be attended to with care.

Directions. When a ship has passed Round Island on the S. side, keeping at least 2 m. off in passing, she should steer for Gunner's Quoin, and give a berth to the S. end of Flat Island in sailing along, on account of rocks extending to S.W. of the light-house, about 1 m. off, directly opposite to the Gunner's Quoin. She ought to keep at least in mid-channel, or nearest to Gunner's Quoin, taking care not to approach very close to the latter, there being several rocks extending from the N. side of it about 2 cables off. The Gunner's Quoin is on the W. part of the island, which is 515 ft. high, and steep close to the sea. From the highest part of the Quoin, Cannonier Point Light-house bears S.W. by W. about 5 m.; but this point must not be approached near, as breakers project about $1\frac{1}{2}$ m. Between the Gunner's Quoin and the main, close under the Quoin, there is tolerable anchorage in 10 to 20 fathoms, and here the fleet of transports anchored in Nov., 1810, and landed the troops prior to the capture of the Island of Mauritius.

If a ship, in passing through the channel among the islands experience a calm, she ought to anchor with a stream or kedge in 15 or 20 fathoms, gravel or coral, which is the common ground here; but, if she fall to leeward of Round Island, it is safest to pass outside of Flat Island also, keeping about $1\frac{1}{2}$ m. from it; then pass to W. of Gunner's Quoin, and steer for Cannonier Point, on which is a *fixed* light, which should not be approached within $1\frac{1}{2}$ m., by not bringing Flat Island *revolving* light to the N. of E.N.E., till Cannonier Light is *abeam*, or S.E. by S.; then she may steer to S.W., keeping more than 1 m. from the reefs that extend along the coast; to avoid these, she ought to keep in 15 fathoms at least in the daytime, and in 20 fathoms during night.

After rounding Cannonier Point, vessels must be careful not to bring its light to the W. of Flat Island Light, till the floating *flashing* light at the Bell Buoy is seen; they may then steer for the latter about S.S.W.; and at night they should then anchor in 14 or 15 fathoms, about 4 or 5 cables' lengths on that bearing, from the light-vessel which is to N.W. of the Bell Buoy. If the wind should be at N. in the daytime, or N.W., which is sometimes the case, it will be needless to anchor outside, because you may then easily enter the harbour, if acquainted, the channel being marked out by buoys with small flags upon them. But a vessel cannot enter till she has received *pratique*. In the day, discoloured water on the reefs will be seen at a considerable distance; if a good look-out is kept from the fore-yard, should a ship by chance approach any of them too close. The pilots generally come out 2 or 4 m. from the harbour, to carry ships in, particularly if the necessary signal is made. As the wind generally blows directly out of harbour, ships are obliged to warp in, by coir hawsers laid along one of the lines of buoys, to each of which the hawser is stopped by a rope-yarn, to keep the ship in the fair channel between two lines of buoys; and a diver attends to cut the rope-yarn as each buoy is approached. Mid-channel between the lines of buoys is the best track to have deepest water, and to keep clear of wrecks sunk near the edges of the channel. All vessels above 100 tons burthen must take a pilot. A lifeboat is stationed here.

From Oct. to Feb., when winds are inclined to vary, and sometimes blow from N. and N.W., the current is then liable to run to the E. along the N. side of island; at such times, ships may approach Port Louis with facility by coming round the W. side. This is the best season for ships crossing over from Madagascar to Mauritius and Bourbon.

A vessel making the island from the E. (the windward side) should give a berth of $2\frac{1}{2}$ m. to the reefs off Amber Island, and should be careful not to approach the *revolving* light on Flat Island, on a course to the *Northward* of N.N.W. $\frac{1}{4}$ W., until Gunner's Quoin bears W. by N., when a course may be shaped mid-channel, to pass between Gunner's Quoin and Flat Island, as above directed. Most ships will have no need to approach Flat Island, but vessels bringing coolies have to be inspected by medical officers from that island. These vessels, and steamers coming from Bay of Bengal, must give a wide berth to the reef that stretches S.S.E. from Gabriel Islet, by not steering for Flat Island Light till it bears (by compass) N. by W.

It is generally advisable for the vessel passing Cannonier Point to lie to (making sail occasionally, to preserve her position), so as to gain the anchorage at daylight, in preference to attempting it at night, by which, in but few cases, has time been saved. Considerable risk, as well as the necessity for anchoring outside, will thus be avoided. After passing Cannonier Point, too much caution cannot be taken to prevent the vessel being set within the *red* range of that light, before she has run the distance of $6\frac{1}{4}$ m.

Tides. The tides between the islands* at the N. end of Mauritius, and along the edges of its reefs, run at times (June, July, and Aug.), about 5 or 6 knots per hour (on the flood, which sets to the N.), and generally 3 or 4 knots. Care must be taken in the navigation of sailing-ships, lest they be drifted into danger. The ebb-tide, which then sets to the S.W., between Gunner's Quoin

* We cannot find any good account of the current, or tide-stream, amongst these islands; it must to some extent vary with the prevailing wind; and without some knowledge of the actual *set* at different points of Mauritius, the navigator must rely upon the *lead* to indicate which way the vessel drifts.

and Cape Malheureux, causes a *race*, which is heaviest also between June and Aug. Off Cape Brabant, the S.W. point of Mauritius, the tides also run very strong, and they vary in direction according to the prevailing winds. The rise and fall is very little, 3 ft. only at spring-tides: at Port Louis it is H. W. on F. and C. of moon at 12 h.

A time-signal for rating ship's chronometers has been established at Port Louis since April, 1833. On Tuesdays and Fridays a circular black disc, painted on the Observatory wall, and distinctly visible from the harbour, is, by means of a shutter, suddenly obscured at the instant of 1 o'clock, Mauritius mean time. A white and blue flag is hoisted on the Observatory tower at noon, and lowered about five minutes before the obscuration of the disc; and if any error has been committed in making the signal, the flag is again hoisted.

The S. COAST of MAURITIUS, from Cape Brabant, trends about E.S.E. 12 m. to **Port Souillac**, when off which place the E. side of the Savanne Hills will bear about N. This is the S. point of the island, in lat. $20^{\circ} 38' S.$, lon. $57^{\circ} 30' E.$; hence the general direction is about E. by N. for 11 m. to **Point Souffleur**, and thence Fouquier Island Light-house is about 7 m. to the N.E., the S. point of Mahabourg Bay being mid-way between them.

GRAND PORT, called formerly Port Bourbon, is the S.E. port of the Island of Mauritius. It is little frequented, being on the windward side of the island; the trade-wind blowing generally into it, the navigation out is thereby rendered very difficult; more so, as the two channels are narrow, and formed between reefs. At F. and C. of moon there are breezes at times from the land, when a ship may be enabled to get out of this harbour. The E. channel (or N. entrance on the chart), is of great length, winding, narrow and intricate. The W. channel (or S. entrance* on the chart), although narrow and winding, is more safe; in entering it you keep Passe Island (which is on the edge of the E. bank, and nearly $\frac{1}{2}$ m. to W. by S. of Fouquier Light-house) close on board, and when round it, you haul to the N.N.E. to avoid the point of Passe Island Reef, and may then anchor in the basin, in 20 or 15 fathoms. If you are to proceed for the harbour, the channel may be perceived by colour of the water, as the dangers plainly appear. This harbour is secured from all weather by a reef, great part of this being dry at L. W.

Mahebourg, the town of Grand Port, is in the bay, about 4 m. to the W. of the light-house, but Old Mahebourg is at the S.W. foot of the Lion Mountain; between them are several islets and reefs marked by beacons, and you must be piloted in. This place was only a military station till about twenty years ago, when it was thrown open to trade, and for the last ten years it has had a good light-house. Grand Port Peak, or Lion Mountain, 1,700 ft. high, is an excellent land-mark, and stands about 4 m. to N.W. of the light-house; and Bamboo Peak, 2,200 ft., is about 3 m. to N.E. of the Lion. A bank of shoal water stretches from Mahebourg and the point on its S. side, towards the light-house, narrowing the S. entrance to about a width of $\frac{1}{2}$ m., where a beacon is placed to W. by N. of Passe Island; but the E. extreme, or Laverdie Point of this shoal, is about 1 m. to S.S.W. of Isle Passe; and off it to the E., there is a 6-fathoms spit, that sometimes breaks.

Light. **Fouquier Island**, in lat. $20^{\circ} 24\frac{1}{2}' S.$, lon. $57^{\circ} 47' E.$, has now a light-house, exhibiting a *fixed* light, elevated 108 ft., and visible 16 m.; this may be approached on any bearing between W. by S. and N. by E.; but to enter the port, ships pass to S. of Passe Island, or fully $\frac{1}{2}$ m. to S.W. of the light.

Directions. A Government pilot is stationed at the light-house, and will board vessels bound to Grand Port, on their making the usual signals. They may approach the light when it bears between N. by E. and round by N.W. to W. by S.; and when about 2 m. from it during day, or 4 m. off at night, they should heave-to for the pilot with the vessel's head off shore.

Seeking shelter, a vessel may approach under easy sail till about $\frac{1}{2}$ m. from the light (avoiding the 6-fathoms shoal, which is $1\frac{1}{2}$ m. to S. of the light); then steer to round Isle Passe at 3 or 4 cables off (to avoid the spit, which runs off about 1 cable to the S.); and when the light and Isle Passe come together, haul up to N. and N. by E., and anchor in 18 to 15 fathoms, with Passe about S. and the light about S.E. Necessity only should induce a vessel to enter without a pilot. At times the rollers block the channel, although the depth is from 14 to 22 fathoms; the reefs on either side are generally visible from aloft.

The lead carefully hove will prove a guide in thick weather, as off Grand Port the coast-reef has a bank of irregular soundings, running some distance sea-ward.

The N. entrance. Steer W. for Bamboo Peak, until you perceive Roches Island, surmounted by a beacon, visible at 5 m. This rock forms the N. side of entrance; and should be passed about 3 cables off; you must then steer S.W. $\frac{1}{2}$ W. about 2 m., when you will see on the port bow a

* It is strange that the Directories by both Imray and Findlay call *this* the Eastern entrance; but in Colonel Lloyd's Directions, issued in 1846, and on the Admiralty charts, it is called *properly* the Southern entrance.

remarkable isolated breaker, called the "Diamant," opposite the Danish Channel. Do not let the "Breaker" come on with Fouquier Light-house till the N. end of Flamand Island (on your *port* beam) bears E. by S.; then haul up for Grand Port Peak (Lion Mountain, 1,700 ft. high) seen over Point Diable; and before Mahebourg begins to disappear behind the latter point, and before Diamant Breaker comes on with the S.-most of the islets which you have just passed, steer down for the light-house about S.S.W., rounding Devil's Point at $\frac{1}{2}$ m. off, and hauling up to S.W.; you will then anchor in 9 or 10 fathoms, sand and gravel, Devil's Point bearing about N., and the point of Old Mahebourg (below Lion Mountain) about W. by S. $\frac{1}{2}$ S. In passing Devil's Point, take care to keep closer to the Danish Entrance Reef than to the land, as there are two large banks more than $\frac{1}{2}$ m. from shore, with 2 and 3 fathoms; there is a narrow channel betwixt them and the shore, with 4 and 5 fathoms; it would not be advisable to attempt going any farther towards Mahebourg, unless acquainted with the channels between shoals, or having a pilot on board.

Danish Entrance, nearly E.S.E. from Bamboo Peak, has a small depth of water,—3 fathoms (which occasions a heavy cross sea, sometimes breaking from point to point), and should not be attempted without a pilot; there is a large coral bank in centre of the pass, on which there are only $2\frac{1}{2}$ fathoms.

The S. Entrance, less intricate than either of the above, is about 8 m. S.W. from the N. entrance, and can easily be made out by the light-house and Isle Passe, which form the N. side, as well as by a remarkable mountain in-shore, 1,700 ft. high, called the Lion's Head, which, in making the Passe, you must keep N.W. by N. Isle Passe is covered with houses and fortifications, and must be rounded about 3 cables off, until you get the centre to bear E. by N.; then steer for the Devil's Point about N.N.E., and after running about $\frac{1}{2}$ m. you must anchor in 13 fathoms, sand and gravel, Isle Passe bearing S.; and do not bring the three islets (which are about $\frac{1}{2}$ m. to N.E. of the light-house) to the E. of an E. by N. bearing, nor the light to the S. of S.E. It is not advisable to proceed farther without a pilot.

REUNION, BOURBON, or MASCARENHAS, is of round form, and 16 leagues from N.W. to S.E., which is its greatest length. There is a volcano near the S.E. part, 7,300 ft. high, and the high central mountain, called Snowy Peak, in lat. $21^{\circ} 5' S.$, lon. $55^{\circ} 30' E.$, is 10,000 ft. high. This island is larger than Mauritius; the slopes, to a height of nearly 3,000 ft., are covered with wood, and its declivity down to the sea is cleared and cultivated in two-thirds of its circuit; the remainder is covered with lava of the volcano, which generally burns gently, and without noise; but it is sometimes violent in the rainy season. The island has no safe port, where ships can be sheltered from bad weather; on which account vessels seldom remain long at anchor, especially during the rainy season. Hurricanes are liable to happen from Nov. to the latter end of April, and are more particularly dreaded about the F. and C. of moon. In this season it is thought unsafe to anchor, except during four or five days after the new or full moon, and vessels do not remain more than five or six days, or even less, for fear of storms at the phases. The hurricanes at Bourbon are thought to be more violent than at Mauritius; notwithstanding which, ships touch at the island in the stormy season, to load coffee and sugar and take in provisions.

Reunion, though having regular mail communication by the Messageries Maritimes Steamers with Mauritius and Aden, is visited by few British sailing-vessels, as its harbours are so unsafe. Sugar is the principal export. St. Paul seems a preferable port to St. Denis. At the islands Reunion and Mauritius, there are occasional rollers, similar to those of St. Helena and Ascension (see page 59), which interrupt communication with the shore for a day or longer. Places on the *weather*, or the E. and S. sides of Reunion, have such unsafe anchorages that few vessels go there. Even at St. Denis, there is no shelter, and at the appearance of bad weather between Nov. and April, ships should leave immediately.

Ships sometimes go to St. Pierre, a miserable roadstead on the S.W. side, about 5 leagues to W. by S. of the Volcano Peak; but they seldom get off without losing an anchor or cable in nearly 30 fathoms, water.

St. Denis, at the N. part of the island, is the principal town, situated in lat. $20^{\circ} 52' S.$, lon. $55^{\circ} 30' E.$; but being exposed to all winds from N.W., round by the N. and E., to S.E. (which bring in a heavy swell), the anchorage, to N.W. of the town, is very bad, in from 10 to 17 fathoms in the bad season, but nearer to shore during the fine season. Even in the fine season, more or less swell rolls in and prevents cargo from being landed. Landing is effected at the *Barachois*, an iron pier, projecting over the breakers. On the wharf at St. Denis, there was a wall, from which the heads of shears were supported by tacklings, and from them stages suspended; under these the cargo-boats were placed to receive or deliver cargo. A hanging rope-ladder is also attached, for persons to ascend or descend. A blue flag is shown at the flag-staff when boats ought not to approach the shore, and this signal, enforced by a gun, is for vessels to proceed to sea.

LIGHTS. Bel-air Point Light-house, in lat. $20^{\circ} 53' S.$, lon. $55^{\circ} 39' E.$, about 10 m. to E.S.E. of St. Denis, has a *fixed* light, elevated 150 ft., visible 18 m. off. The light-tower is 60 ft. high, and the land by it nearly 100 ft. above sea-level.

St. Denis Lights, in lat. $20^{\circ} 51\frac{1}{2}' S.$, lon. $55^{\circ} 30' E.$, at the Barachois (an iron pier), are two vertical *fixed* lights 12 ft. apart, on a flag-staff about 80 ft. high; they are visible 8 m. off as one light, but within 5 m. can be distinguished as two.

St. Paul Bay lies at the N.W. part of the island, about 5 leagues to W.S.W. of St. Denis; Captain Bilton of the *Rouena* says, it is the only good roadstead in the island, and *that* only during the fine season, from mid-April to mid-Nov. In that fine season, the wind at St. Paul is from S.W., blowing round the island, and then the anchorage is in about 12 fathoms, with the flag staff about S.E. or S.E. by E. In the bad season, the wind is at N.E., and vessels anchor farther out in about 20 fathoms. When blown off St. Denis, vessels frequently come here, as hurricanes mostly pass away to the N., doubtless being broken by the high land of the island, but some passing to W. off the N. side, re-curve to the S., along the W. side of Reunion.

Light. At the landing-place of St. Paul, a small *fixed* light is shown on a mast, elevated 72 ft., and visible 7 m. off.

EAST COAST OF MADAGASCAR.

Cape St. Mary, the S. point of Madagascar, in lat. $25^{\circ} 39' S.$, lon. $45^{\circ} 8' E.$, is bold mountain land, with soundings of 30 and 40 fathoms, about 4 or 5 m. off shore. Thence the general direction of coast towards Fort Dauphin, the S.E. point, is (by compass) E. $\frac{1}{4}$ N., for 110 m. The E. coast of Madagascar is more frequented than formerly by English ships, since the island Mauritius became a British colony: several of her Majesty's ships visit the ports on the E. coast, to obtain refreshments, or otherwise as duty renders necessary: along most parts of the coast, a bank of soundings extends from 3 to 5 m. off shore, containing few hidden dangers.

FORT DAUPHIN, the S.-most port on the coast, in lat. $25^{\circ} 1' S.$, lon. $47^{\circ} 3' E.$; was the earliest settlement of the French, who built the fort, but soon abandoned the place on account of its unhealthiness. **Ytapir, or Itapere Rock**, whose breakers are always seen, is the mark to distinguish Itapere Point, from which it is distant about 1 m. to the S.; but there is no passage between them: these breakers sometimes run very high. At 2 leagues W. from this rock, lies Fort Dauphin: the coast between Itapere Point and that on which the fort stood, forms a cove or bay, named Tolonghare by natives, and Anse Dauphine by the French, who formerly settled there, and of whose fort the remains are still visible. Ships generally go within the elbow made by the point. Having passed Itapere Rock at the distance of a mile, or a little less, steer for Fort Dauphin Point, which has a reef a cable's length off, having good anchorage within it.

Anchorage. A good berth is with Point Itapere E. $\frac{1}{4}$ S., and the extreme of the breakers nearest the anchorage S.E. by E.; the port anchor to the N.E. in 7 fathoms, sandy ground, the starboard anchor in 6 fathoms, having 28 or 29 ft. water under the ship; a third anchor is placed to the N.W. if requisite. When there is not sufficient daylight to reach the road, having doubled Itapere Rock, you may anchor in any part of the bay (if the weather admit), observing that the quality of the ground is not everywhere the same. Indifferent water is obtained at the landing-place by digging in the sand, which may answer for cooking and for the stock; but at a small distance inland, there are plentiful springs of very good water. To the S. of Fort Dauphin Point there is a bay of foul ground, called Galleons Bay. The point is even land, of middling height, and the country is mountainous inland to the N.W. of Fort Dauphin Bay.

Approaching Fort Dauphin. A ship bound to this place should make the land to the N. of the port, on account of strong N.E. and E.N.E. winds, called *Fort Dauphin Winds*, which prevail greatly, forcing a current to the S., rendering it difficult to gain the bay, if a ship fall to leeward. In approaching Fort Dauphin, as the current sometimes sets 16 leagues in twenty-four hours to the S., a ship should anchor in the night, to prevent drifting to leeward, if the weather is favourable, and the bottom not rocky. In lat. $24^{\circ} S.$, there is a chain of very high mountains; and in lat. $24^{\circ} 15'$ to $24^{\circ} 18' S.$ a hummock, in the form of a sugar-loaf, is distinguished amidst some small hills near the sea. Sailing to the S. along the coast, at $2\frac{1}{2}$ leagues' distance, a reef may be perceived in lat. $24^{\circ} 22' S.$, which projects a distance from the shore; and a little farther S., near St. Luce Islands, some small rocky shoals under water, between lat. $24^{\circ} 35' S.$ and $24^{\circ} 45' S.$, require great care. Continuing to sail along at the same distance from shore, a point will be discerned S.W. by W., appearing to stand by itself, with two hummocks, more flat than round; and after this, another point, with hummocks of the same shape. These two points have been often taken for Point Itapere, which is the next, or third in order, having sharp-pointed hummocks.

When you come near the second point, steering along the coast, at $1\frac{1}{2}$ leagues' distance, there are shoals, some of which extend above 2 m. from shore: it is therefore advisable to keep an offing of $1\frac{1}{2}$ leagues, or more.

The Coast. Between Fort Dauphin and Tamatave Road, there appears to be no place of safe anchorage for ships; and consequently, this part is less visited than other parts of the coast. It has several streams of some size, but as yet unsurveyed. The Manankara, in lat. $23^{\circ} 20'$ S., seems a fine river. The French have an establishment at Mahela Lake, in about lat. $20^{\circ} 58'$ S. The town Mahela is on a strip of sand between the lake and the sea, and is visited by two or three vessels in the course of the year; it is near Fanantari River. The Mangouru River, about in lat. $20^{\circ} 15'$ S., is a large stream, and said to have a bar.

Recent travellers have found a series of back-waters along this coast (like those of the W. coast of India), extending inland many miles from the sea, commencing at Ivandru, 9 m. below Tamatave, and stretching for some 200 m. to the S.; these require little trouble to make a complete inland water communication. The least unhealthy time of year commences with May, lasting till Aug., during which period the S.E. monsoon blows nearly up to the equator.

Manoro, or Manourou, in lat. $19^{\circ} 55'$ S., lon. $48^{\circ} 52'$ E., is a town, situated on a high bluff; and it is said a ship might be sheltered inside of the adjacent reefs; but it seems too much contracted for large ships, and ought not to be chosen as a place of refreshment unless in a case of necessity, in the fair-weather season. Excellent rice may be had here.

TAMATAVE, in lat. $18^{\circ} 10'$ S., lon. $49^{\circ} 28'$ E., is a village on a low point of land, having good anchorage within coral reefs, which secure ships from N.E., and S.E., and S. winds, but not from N. winds. Point Hastie, on which stands the town, is environed by a reef to the distance of nearly $\frac{1}{2}$ m., and between the N. point of it and the S. point of the N. or outer reef, is the direct passage, about 3 cables wide, leading into the road, which has depths from 13 to 7 or 6 fathoms. The N. reef extends about $1\frac{1}{2}$ m. N. and S., and its S. point is about 1 m. N.N.E. from the town. About $\frac{1}{2}$ m. N.E. from the N. end of the N. reef, lies another small reef, having a passage between them of 6 or 7 fathoms, water; there is also a passage of 10 and 12 fathoms close along the W. side of the N. reef, leading to the road. About 2 m. N. by E. from the N. extreme of the small reef, there is another small reef and sand-bank, rather more than a mile S. by W. from Plum Island. To the S. of Tamatave, from 3 to 7 leagues' distance, several reefs exist about 3 or 4 m. from shore; and about $\frac{1}{2}$ m. to the S.S.W. of Tamatave Point Reef, there is another small reef, called S. Reef. High water here at 4 h. 15 m., and the rise of tide 8 ft. at F. and C. of the moon. Variation 12° W.

Tamatave is the E. sea-port of the capital Tananarivo, and exports cattle to Mauritius and Reunion; poultry and fruit are procurable. The British frigate *Conway* and two French corvettes suffered a repulse in an attack upon Tamatave in 1845.

Plum Island, or Nossy Alana (Ile aux Prunes), in lat. $18^{\circ} 3'$ S., lon. $49^{\circ} 29'$ E., distant 2 m. from the nearest part of Madagascar, is covered with trees, seen at the distance of 5 leagues, and a reef projects about $\frac{1}{2}$ m. from it to the N., to the S., and E.: to the N.E. of the island shoal water extends about 2 m. off.

When Southerly winds prevail, it is proper for ships bound to Foule Point to make this island; and that place is often preferred to Fort Dauphin, on account of its greater facility and better anchorage, for vessels bound there for refreshments. The coast adjacent to Plum Island is low, covered with trees, and safe to approach, having 8 and 7 fathoms, water, within $\frac{1}{2}$ m. of the shore. A rocky bank, with 15 ft. only, and breakers is said to have been discovered by the ship *Marie Eugénie*, about 3 leagues N.E. from Plum Island; but the French surveyors could not find it. From Plum Island to Foule Point, the coast of Madagascar is of moderate height, uneven and woody, rising gradually inland, till double and treble mountains are seen at a great distance. The shore consists of white sand, lined with breakers, projecting 2 or 3 cables' length into the sea. When Plum Island bears N.W. about 2 leagues distant, you perceive on the N. side a small hill nearer shore than the others, and forming two Paps: they are called the Paps of Natte, from the village in that quarter, where the natives often hoist a white flag. Several vessels have mistaken this place for Foule Point, which lies 3 leagues farther N.; but the Paps (four of which are seen from Foule Point) are to the W. of the latter place. In the season of the N.E. winds, you ought not to make the land to the S. of the place to which you are bound.

FOULE POINT VILLAGE, or Mahavelona, in lat. $17^{\circ} 40'$ S., lon. $49^{\circ} 37'$ E., affords bullocks and refreshments; the surrounding country is well wooded. The fort or battery stands to W. of the village. Anchorage is formed by a large reef, which begins on the shore about $1\frac{1}{2}$ m. to the S. of the village, and extends nearly a mile to N.E. by E. of the point. Come no nearer this reef than $\frac{1}{2}$ m., and range along round its N. point at a little more than a cable's length off:

the breakers are visible, but they show less at H. W., and with a fresh breeze. When round the N. end of the reef, when the battery-mast bears to the S. of S.W. by W., haul to the S.W., and anchor under shelter of it in 6 or 7 fathoms, sand and mud, the N. point of the reef bearing about E. by S. $\frac{1}{2}$ S. and the village S. by W. about 1 m. distant. Ships moor E.N.E. and W.S.W., and if to remain a considerable time, it is proper to have a third anchor to the N.W. Within the reef, close to the point, there is a basin, where a ship might anchor in 4 or $4\frac{1}{2}$ fathoms; but it is not very safe, and hemp-cables are liable to be cut by the rocks. A *supposed shoal*, with 7 fathoms, is marked on the chart at 4 m. to E.N.E. of Foule Point.

Foule Point Bay should only be frequented in the fine season, when the S. and S.E. winds prevail, the reef affording no shelter against N. winds or stormy weather. The winds here are periodical, the S.E. and S. prevailing from April to Oct. or Nov., and the N.E. or Northerly winds during the rest of the year. A certain sign of your approach to land in the season of the N. winds, and during the greatest part of the year, is a large bank of black clouds, of an even appearance, which gathers during the day over Madagascar.

Fenerive, in lat. $17^{\circ} 23' S.$, lon. $49^{\circ} 30' E.$, is a small town with a trade in rice, situated at a concavity of the coast, where the anchorage is sheltered from S., but not from S.E. winds, in from 5 to 6 fathoms, about 1 m. off shore: but a large vessel must not let Takondro Point (to S.E. of Fenerive) be shut in behind Nossy Lanasambo, the island which bounds the S. side of the anchorage. There are 2 and 3 fathoms, water, close to the point where the town is built, but a little to the N.W. and S.E., reefs and islets project about $\frac{1}{2}$ m. from the shore.

ST. MARY ISLAND, or Nossy Bourah (the S. Point Blevee), in lat. $17^{\circ} 7' S.$, lon. $49^{\circ} 52' E.$, and about 12 leagues N.E. by N. from Foule Point, and called by natives Nossi Ibrahim (Abraham's Island), is a long and narrow island, hills from 200 to 300 ft. high, covered with trees; it lies parallel with the coast, extending from lat. $17^{\circ} 7' S.$ to $16^{\circ} 40\frac{1}{4}' S.$, in a direction about N.E. by N. Between this island and Madagascar the channel is safe for ships of any size, the narrowest part being about 4 m. wide, having from 27 to 33 fathoms in mid-channel; and usually the depths are from 17 to 32 fathoms between the Island and the main, throughout the channel, decreasing towards the shore in some places. The narrow part of the channel is near the middle of the Island, and formed by Larree Point, projecting about 8 m. beyond the other part of the Madagascar shore.

The S. point of St. Mary is formed by a small flat isle, called Nattes by the French, separated from the great island by a very narrow gut, or channel; and a reef extends from this islet about $1\frac{1}{4}$ m. to the S.W., the S., and S.E. The whole of the E. side of St. Mary is fronted with reefs of breakers and some sand-banks, $2\frac{1}{4}$ or 3 m. off shore. In lat. $16^{\circ} 55\frac{1}{4}' S.$, the Whale Rock, a detached reef, is 3 m. off shore. On the W. side, about 7 m. from the S. point, is Port St. Marie Bay, with an island called Quail Island at the entrance, where small vessels may find shelter.*

Quail Island had a French factory in the last century, which they abandoned, the place being unhealthy, and the natives treacherous; but they made several later efforts with more success, and have cleared much of the jungle of the Island. To anchor at this place, steer along the S.W. end of St. Mary, in 18 or 20 fathoms, and, having rounded a large black rock off the S.W. point of the bay, anchor in 18 or 20 fathoms, with Quail Island bearing about S. by W.; Point Larree will then bear nearly N. by E., distant about 3 leagues. The tide rises here 5 ft.; H. W. at 4 h. on F. and C. of the moon. The months most liable to storms or hurricanes are Jan., Feb., and March. The sickly season prevails from Dec. until mid-May.

Tintingue, or Tangtang, in lat. $16^{\circ} 42' S.$, within the Island St. Mary, about $3\frac{1}{4}$ leagues N.W. from Point Larree, is a bay or harbour full of shoals at the entrance, having a channel between the reefs from $\frac{1}{2}$ m. to $\frac{1}{4}$ m. wide, with 8 and 10 fathoms, water, and moderate depths for anchoring inside, in 5 to 7 fathoms, sheltered from all winds within the reefs at the S. part; but more securely in 4 or $4\frac{1}{4}$ fathoms inside of the peninsula that forms the N. part of harbour.

Tides. High water on F. and C. at $4\frac{1}{2}$ h.; rise of tide 6 ft. at springs.

ANTON-GIL BAY, named Manghabet by the natives, takes its name from Antonio Gil, a Portuguese captain, supposed to be the first European who entered it. From the N. end of St. Mary, the entrance of this Bay is distant about 11 leagues, bearing N. It is about 13 leagues in length from N. to S., and $6\frac{1}{4}$ leagues broad at the entrance between Cape Bellones and Durnford Noss, these bearing about E.N.E. and W.S.W. from each other. Cape Bellones is in lat. $16^{\circ} 14' S.$, and Durnford Noss, the E. side of the entrance, is in lat. $16^{\circ} 1' S.$, lon. $50^{\circ} 11' E.$ In sailing towards Anton-gil Bay, in the Southerly monsoon, pass through the channel between St. Mary and the main land, or to the E. of the island, at discretion; but in the Northerly monsoon, do not make

* Light-houses have been proposed for one or two points of St. Mary Island.

St. Mary; for then, a direct course ought to be steered for the entrance of the Bay, and sail along either side of it, as most expedient; the depths decrease to 30, 20, and 15 fathoms, as Port Choiseul, at the head of the bay, is approached.

Marosse, in lat. $15^{\circ} 30' S.$, is an island about 2 m. in extent, and $1\frac{1}{2}$ m. distant from the point of Tungumbaly River, at the head of Anton-gil Bay, having four islets to the S., the farthest of these distant from it about $4\frac{1}{2}$ or 5 m. The common anchorage is to the N. or the W. of Isle Marosse, at the distance of 2 or 3 cables, opposite to two small sandy coves, in 11 or 12 fathoms, and called Hastie Road by the late Admiral Owen. Wood and water are procured here with great convenience, and tents may be erected safer than on the main, where you must trade for provisions. The river's mouth bears N. by W. from Isle Marosse, and is navigable by large boats, having $1\frac{1}{2}$ fathoms at the entrance, and 3 or 4 fathoms for a little distance inside. The anchorage to the N.W. of the river is an excellent harbour, called by the French **Port Choiseul**, where ships may anchor in 6 or 7 fathoms, close to the village of Maran Seetzly. Rice, bullocks, &c., are procured here.

Departing from Anton-gil Bay, bound to the N., steer along the E. shore, taking advantage of favourable breezes with the ebb-tide. At a small distance S. from Durnford Noss, lies a small island called Behenter, to the S. of which ships may anchor when trading to this place. From hence the coast extends about 2 leagues E., and is lined with a reef projecting 2 m. out, till it joins another islet called Nepatte; from this islet the direction of the shore is about N.E. $\frac{1}{2}$ N. for 3 or 4 leagues, then about N.E. by N. to Cape East. **Veninguebe Bay**, in lat. $15^{\circ} 57' S.$, about $1\frac{1}{2}$ leagues to the N. of the E. point of Anton-gil Bay, is about $\frac{1}{2}$ m. wide between the entrance reefs; it appears unsafe, particularly for large ships. On the point of the reef forming the N. side of the Bay, which is very extensive, the French frigate *La Gloire* was lost.

NGONCY, or CAPE EAST (outer islet), in lat. $15^{\circ} 16' S.$, lon. $50^{\circ} 31\frac{1}{2}' E.$, is the E.-most point of Madagascar, and the town is about $1\frac{1}{2}$ or 2 m. to the N.W.: the whole of the coast hereabout is lined with reefs, which in several places project 2 m. from shore; it is, therefore, proper to keep at least an offing of 1 league in sailing along. From Cape East to Vohemar Point, in lat. $13^{\circ} 24' S.$, the direction of the coast is about N. $\frac{1}{2}$ W., and N. by W. to N. by W. $\frac{1}{2}$ W., from this bay to Cape Ambre. From Cape East to Cape Ambre, the land is generally high and uneven, except near the sea; in some places it is level, and of moderate height. The shore is rocky, with several islets and coral reefs, projecting 1 to 4 m.

Ngoncy Road, or Cape East Bay, in lat. $15^{\circ} 13' S.$ (the entrance), is $1\frac{1}{2}$ or 2 m. to the N. of the outer islet, formed between reefs, and is about $\frac{1}{2}$ m. wide, with soundings of 5 to 8 fathoms; and at the S. part of the road there are 4 and $3\frac{1}{2}$ fathoms about 1 m. inside of the entrance, where vessels are sheltered by the reef that extends to the N. from Cape East from all winds, excepting those from N.E. to N. Ngoncy Town is situated at the S. part of the bay, and Noabe Town is $1\frac{1}{2}$ m. to the N.W., upon the sandy peninsula that forms the S. side of the entrance of Noabe, or Great River, which is shoal, and barred by reefs.

The Coast above Cape East has been little examined, but its general direction is N. for 120 m. to Vohemar Point, in lat. $13^{\circ} 23' S.$, lon. $50^{\circ} 3' E.$, which has an anchorage sheltered by a coral reef, opening to S.E., and has depth enough for large vessels, which could run in with a fair wind if the channel were buoyed. Manambattoo Village is in lat. $13^{\circ} 14' S.$, lon. $49^{\circ} 58' E.$; but there are no safe places yet for ships to anchor on this part of the coast, till you come to Port Leven.

Andrava Bay, in lat. $12^{\circ} 57' S.$, lon. $49^{\circ} 56' E.$, is about $1\frac{1}{2}$ m. in extent, and circular, with an island in the middle of the entrance, having depths of 4 to 6 or 9 fathoms on either side; but reefs project from the N. and S. extremities of these islands. This Bay is open to N. and N.E. winds, but there appears to be good shelter from E. winds in 4 or 5 fathoms, at the S. extremity of the Bay, about $\frac{1}{2}$ m. to the S.W. of Berry Head, which forms the E. point.

Port Leven, discovered and surveyed by the late Admiral Owen, is formed on the E. side of an extensive reef encircling five islands, and several rocky islets, which project about 2 leagues to the N. from Point Liverpool, the N.W. boundary of Andrava Bay. Nossy How, the N. island, is in lat. $12^{\circ} 47' S.$, lon. $49^{\circ} 53' E.$, and Nossy Manambedy is another island about 8 m. to the N.W., also environed by a reef, and contiguous to the main land: between these two islands and their projecting reefs is formed the entrance of Port Leven, about a mile wide, until about $2\frac{1}{2}$ m. inside, where the channel is contracted to about $\frac{1}{2}$ m., and continues nearly the same for 2 m. farther up the harbour, with depths usually from 8 to 6 fathoms, even soundings, throughout the port and in the entrance, excepting a patch of 3 fathoms to S.W. of the N. point of Nossy How, and nearly in mid-channel. The course into the harbour is S. by W. for $2\frac{1}{2}$ or 3 m., then S. $\frac{1}{2}$ E. in the upper part, or inner harbour, which is sheltered from all winds; as is also a basin, or large opening in the reef, on the W. side of entrance near the main land, with depths from 6 to $3\frac{1}{2}$ fathoms.

There is a high mountain inland, called Sango-goro by the natives, but Ambre Mountain by the late Admiral Owen, the centre of which is in lat. $12^{\circ} 35' S.$, lon. $49^{\circ} 11' E.$, and it extends several miles N. and S., sloping down towards British Sound.

Port Looke, or Louquez, in lat. $12^{\circ} 46' S.$, seems to be a safe harbour; Point Bathurst, that bounds the entrance on the E. side, is in lat. $12^{\circ} 44' S.$, lon. $49^{\circ} 47' E.$, fronted by an extensive coral bank, betwixt which and another to the W. lies the entrance of the port; the latter bank having an island on its N. part, called Nossy Kahoomby, or Sandy Island, which is about 3 m. long. When abreast the S. end of this island about $1\frac{1}{2}$ or 2 m. off, the course is about S.S.W. between the entrance reefs, and the distance about 5 m. to a safe cove or harbour, having an even bottom of sand from 5 to 9 fathoms, where ships are sheltered from all winds. The entrance leading to it is from $\frac{1}{2}$ m. to $\frac{3}{4}$ m. wide, with deep water in it, from 20 to 40 fathoms; and no soundings 2 m. outside.

About $1\frac{1}{2}$ or 2 m. above the harbour, at the head of the inlet, there is an inner harbour having 4 and 5 fathoms, sandy bottom, where the French vessels usually moored when they visited this port. Between the outer and inner harbour, an extensive bank projects from the point on the E. shore, about two-thirds across the channel, which makes it very narrow in this part. It is H. W. on F. and C. at $3\frac{1}{2}$ h. at Point Bathurst, and the tide rises 7 ft. On the S.E. side of the point, there is a bay very open to the N., called False Port. Variation, $8\frac{1}{2}^{\circ} W.$

BRITISH SOUND entrance is in lat. $12^{\circ} 14' S.$, lon. $49^{\circ} 24' E.$: within the entrance it branches into several bays, named by Admiral Owen, Irish, Scotch, and English Bays, also Welsh Pool. The entrance of the Sound is $\frac{1}{2}$ m. wide, with about 24 fathoms, water, close to its S. side, and from thence to mid-channel; and shoaling gradually to 4 and 3 fathoms near to Clarence Island, which bounds the N. side, and is off the point of main land; an extensive reef stretches from this point and Clarence Island to other islands to N.E. at 2 and 3 m. distance. In the middle of the Sound there are 35 fathoms, shoaling gradually to the shores of the bays inside. About 3 m. W. from Clarence Island, nearly in the centre of the Sound, lies Chapman Rock above water, standing 1 m. to S.E. of George's Head, and there are some islets in the different bays, with brooks of water near the village, a little within the entrance of the Sound, on the S. side.

Tides. H. W. at F. and C. of moon at 4 h.; rise of tide 4 ft.

Diego Suarez Bay, in lat. $12^{\circ} 10' S.$, and 4 m. to the N. of the entrance of British Sound, is formed by an opening between small islands and reefs, being $\frac{1}{2}$ m. wide at the entrance: but it was not examined. Colonel Lloyd, of Mauritius, said that the British Sound is the proper "bay of Diego Suarez," but doubtless it will some day assume its native name, said to be Mahazeba.

Cape Ambre, the N. extremity of Madagascar, is situated in lat. $11^{\circ} 57\frac{1}{2}' S.$, lon. $49^{\circ} 19' E.$ Ambre Mountain is about 12 or 13 leagues to the S. of the Cape, and is a regular sloping mountain. Windsor Castle, another mountain, of less elevation than the former, lies in lat. $12^{\circ} 13' S.$, about $3\frac{1}{2}$ leagues W. from the entrance of British Sound; and looks down upon the bays of the N.W. coast. Several conical hills are interspersed betwixt the Sound and Cape Ambre; but this Cape is a low point of land, terminating in a ledge of rocky islets, having 15 fathoms close to them, and 20 or 25 fathoms about $\frac{1}{2}$ m. distant. Soundings of 18 and 20 fathoms are got near the shore, betwixt the Cape and British Sound, but the bank shelves off suddenly to no ground.

Seasons. Relative to the E. coast of Madagascar, it should be observed, that Fort Dauphin is generally healthy at all times. The coast towards Foule Point is unhealthy only in the bad season; the country is more so as you proceed N., but near Cape Ambre it is stated by Colonel Lloyd to be healthy. To preserve your crew from the diseases prevailing during the unhealthy season, allow none of them to sleep on shore after Nov.

The winds at Cape Ambre range between N.E. and S.E.; the mean direction between April and Oct. is about S.E., whilst from Nov. to March, it is E.N.E. From Cape Ambre, the currents set generally strong to the W. all the year, towards Comoro Islands and the coast of Africa. Several navigators have experienced a set of 15 or 20 leagues in 24 hours, to the W. None but steamers, therefore, attempt to pass round Cape Ambre from W. towards the E. These currents will be more fully described in another chapter. (*See Currents, in Index.*)

ISLANDS AND DANGERS N.E. AND N. OF MAURITIUS.

Sandy Island, or Tromelin, in lat. $15^{\circ} 53' S.$, lon. $54^{\circ} 35' E.$, is about 15 ft. above water, $\frac{1}{2}$ m. long from N.N.W. to S.S.E., and about $\frac{1}{2}$ m. broad, having a sand-bank projecting $\frac{1}{2}$ m. S.S.E. It was discovered by the ship *La Diane*, and called Ile de Sable. Captain Moresby visited this island 6th March, 1822; and again on the 24th of July, having reached it after a run of only forty

hours from Port Louis; and he was sixty hours from the same place at the first time. He found it to be very low and sterile, about $\frac{1}{2}$ m. in length, with a reef extending from the S. point. The N. point appeared to be a steep sand-bank, up which the sea rolled a considerable distance. Off the N.W. end, about 1 m. distant, the boat sounded in 11 fathoms, uneven bottom, sand and coral; which soundings are on a spit that extends a mile or more in a N.W. direction. The *Wizard* rounded the island on the W. side, whilst the *Menai* did so on the E. side at $\frac{1}{2}$ m. off; and, except on the spit mentioned, could not obtain soundings with 100 fathoms line. The wreck of a vessel, apparently of 140 tons, lay half embedded in sand, and, from her position and aspect, probably had been several years in this situation. There was also a small hut and flag-staff on its E. end.

CARGADOS GARAJOS,* or St. Brandon Rocks (so called by fishermen from Mauritius), as shown by Sir E. Belcher's survey of 1846, consists of a crescent-shaped, coral bank, having three islets on it—called *Etablissement*, near its N. extreme; *L'Avocare*, towards the centre of its W. or concave side; *Mapare* and *Coco* on its S. extreme; and six other islets detached from it, four to the W. and two to the N. of it, called respectively, reckoning from the N.—**Albatross Island**, in lat. $16^{\circ} 14'$ S., then North, Siren, Pearl, Frigate, and Verronge Islands. The entire group lies between the parallels of $16^{\circ} 14'$ and $16^{\circ} 50'$ S., and the meridians of $59^{\circ} 30'$ and $59^{\circ} 45'$ E., having a bank of soundings extending 20 m. in a N.N.E. direction. That shown on the chart extends about 15 m. both to the W. and to the N. of the main bank, deepening gradually to 32 and 34 fathoms at this limit. The E. or convex side of the main bank is very steep-to, decreasing suddenly from 30 to 5 fathoms, so that no vessels should approach it, except with extreme caution. The entire W. side of the main bank, in addition to the islets described, is fronted by small detached shoals and reefs. North Island lies $2\frac{1}{2}$ m. N.E. from the N. extreme of the main bank, and Albatross Island 10 m. N. of the same point. There is a channel between these two islands, with depths from 8 to 15 fathoms, and also between North Island and the main reefs; there are breakers, shown to lie 2 m. N.E. of North Island, and a $1\frac{1}{2}$ -fathom bank about a mile S. of this island. At 8 m. N. by E. from Coco Island are the Baleine Rocks, just awash. N.E. $\frac{1}{2}$ N. $2\frac{1}{2}$ m. from Pearl Island, is the Pearl Reef. Water is very difficult to procure, and very bad; but fish are plentiful. Only two cocoa-nut trees, and these in a decayed state, now remain in Coco Island. A few Mauritius fishermen reside during the fishing season on *Etablissement* Island.

Coco Island is in lat. $16^{\circ} 49'$ S., lon. $59^{\circ} 30'$ E. High water, on F. and C., at 2 h., rise 4 ft. The ship *Indian*, of Jersey, was wrecked on the outer edge of these dangerous reefs, on the 4th of April, 1850; and out of thirteen persons who remained by the ship after the captain had quitted her, seven succeeded, on her breaking up, in reaching the inner edge of the reef, and wading along it for 3 or 4 m. to a sand-bank farther to the N., abreast of Verronge Island. After seventeen days of great suffering and privation, they were rescued from this perilous situation by the schooner *Eliza* and *Jane*, belonging to Mauritius, and conveyed to that island. Sir E. Belcher states that the fishermen, landed for the fishing season by the schooner on the sand islet contiguous to Coco Island, call that islet St. Brandon. The loss of the E. I. C.'s ship *Cabalva*, in 1818, and subsequent disasters, show the necessity of great caution in crossing the parallel of these dangers in the night.

A ship coming from the E. may haul to the N. of all the banks, and run down to the W. of them, which passage is free of danger, excepting the *visible reefs*, with breakers on them. A shoal bears W. 6 or 7 m. from the N. point of Sandy Island. Soundings extend to N. and to E. of Albatross Island, gradually deepening to 45 fathoms at 10 leagues off.

Nazareth Bank, to N.E. of the Cargados Garajos, was partly sounded by the *Wizard*, and a small portion by Captain R. Moresby, of the Indian Navy, who thought the extreme N. end to be in lat. $13^{\circ} 40'$ S., and the E. part to be in lon. $61^{\circ} 35'$ E., lat. $14^{\circ} 30'$ S.; and near this last position, 14 and 16 fathoms were found. Vessels from India and the Seychelles often pass over it when bound to Mauritius, and it would be a valuable Direction Bank if properly surveyed. There seems to be a narrow gut of deep water between it and Cargados, and a broad one (of about 100 m.) between it and Saya de Malha; through the latter the current was found, at all seasons of the year, to run to W., from 1 to $1\frac{1}{2}$ m. per hour, whilst to W. of the Saya de Malha it ran at half that rate.

SAYA DE MALHA BANK (or Coat of Mail) extends more to the N. than formerly supposed. Its S. extremity is in about lat. $11^{\circ} 30'$ S., and its N. extremity is known to extend to lat. $8^{\circ} 18'$ S., while in longitude it is between meridians of $59^{\circ} 58'$ and $62^{\circ} 30'$ E. Various ships

* In 1812, an inundation of the sea, it is said, nearly proved fatal to the few fishermen residing on these isles, which are under the British Government of Mauritius.

which have crossed the bank and recorded their soundings, give them from $6\frac{1}{2}$ to 25 fathoms, according to their position on it. The following are the positions of some of the shoaler parts:—

$6\frac{1}{2}$ fathoms in lat.	$9^{\circ} 21'$ S., lon.	$60^{\circ} 14'$ E.
$6\frac{1}{2}$ to 8 do.	$\left\{ \begin{array}{l} 9^{\circ} 47' \text{ to} \\ 9^{\circ} 50' \end{array} \right\}$	$\left\{ \begin{array}{l} 61^{\circ} 21' \text{ to} \\ 61^{\circ} 29' \end{array} \right\}$ E.
7 to 10 do.	$9^{\circ} 3'$	$60^{\circ} 43'$
9 do.	$8^{\circ} 35'$	$59^{\circ} 58\frac{1}{2}'$
10 do.	$\left\{ \begin{array}{l} 9^{\circ} 45' \\ 8^{\circ} 42' \end{array} \right\}$	$\left\{ \begin{array}{l} 60^{\circ} 32' \\ 63^{\circ} 10' \end{array} \right\}$
12 do.	$\left\{ \begin{array}{l} 10^{\circ} 30' \\ 8^{\circ} 30' \\ 8^{\circ} 19' \end{array} \right\}$	$\left\{ \begin{array}{l} 61^{\circ} 50' \\ 60^{\circ} 0' \\ 60^{\circ} 0' \end{array} \right\}$

Navigators are still left in uncertainty whether or not any part of this bank is dangerous; but as the *Cornwallis* had 7 fathoms, the *Northumberland* 7 fathoms on another part, the *Preston* only $6\frac{1}{2}$ fathoms, coral rock, on a different part, and the *Colombo* $6\frac{1}{2}$ fathoms on the E. edge, caution ought to be used by those who happen to get upon this bank; more so, as a French navigator of Mauritius states that there are dangers on the S. extremity, where a ship would be liable to strike on some of the coral patches; and the *Eliza*, French schooner, is said to have been in 4 fathoms, close to breakers on this part of the bank.

Captain Robert Moresby in 1837, well sounded the S. half of the Saya de Malha, as depicted on the Admiralty Charts. These show a small separate bank to S., the centre of which is in lat. $11^{\circ} 30'$ S., lon. 62° E. There is said to be a shoal spot of 4 fathoms at the S. end of the large bank in about lat. $10^{\circ} 50'$ S.; and there are plenty of casts of 10 and 11 fathoms on it, with some of 7 fathoms in lat. $9^{\circ} 45'$ S., lon. $61^{\circ} 20'$ E.

The N.W. portion of Saya de Malha had not been examined when the Indian Navy surveying expedition under Captain Robert Moresby was recalled in 1837, and no subsequent survey has been made. Commander A. W. Stiffe (a careful observer), on a voyage to Bombay in 1864, found 10 fathoms in lat. $8^{\circ} 24'$ S., lon. $60^{\circ} 16'$ E.; comparing this with one sounding of 12 fathoms (as given above), we suppose that the N.W. end of the bank is in about lat. $8^{\circ} 18'$ S., lon. 60° E.; and some shoal spots of 4 fathoms are said to exist upon this extreme also.

The doubtful dangers. The position of George Island, about lat. $7^{\circ} 8'$ S., and lon. $60^{\circ} 53'$ E., was sounded over by H. M. S. *Cyclops* with more than 2,000 fathoms of line, and has been expunged from the Admiralty Charts; Captain Horsburgh never mentioned it in this Directory, and doubtless had good reason for omitting it. **Roquepez**, a low sandy island,* was long ago reported to lie in lat. $6^{\circ} 24'$ S., about lon. $60^{\circ} 1'$ E.; but if it does exist, is probably the **Sandy Isle**, with breakers extending about 3 m. from it, said to have been seen in the *Bridgewater* on the 6th Dec., 1812, then distant 6 or 7 m., and situated in lat. $6^{\circ} 27'$ S., lon. $60^{\circ} 4'$ E. (its S. extremity). **Swift Bank**, from the journal of the *Swift*, Mr. Dalrymple places from lat. $5^{\circ} 17'$ to $4^{\circ} 35'$ S., lon. $61^{\circ} 5'$ to $61^{\circ} 30'$ E. The soundings found on it were from 18 to 35 fathoms. Her Majesty's ship *Cyclops*, Captain Pullen, R.N., passed over the centre of the supposed site and sounded with no bottom at 150 fathoms, in Feb., 1858. **Rose Galley Rocks**, said to be a ledge of rocks and breakers, seen by Captain Gentleman, in the *Rose Galley*, going from Madras to Bombay in the middle of last century; since which time they appear never to have been seen, rendering their existence doubtful. This danger was said to be in lat. $5^{\circ} 30'$ S., and $61^{\circ} 33'$ E. Captain Pullen, R.N., in H. M. S. *Cyclops*, passed a little S. of the supposed shoal, and sounded in 2,254 fathoms, fine white sand, Feb., 1858.

Rajaswarree Breakers, reported in lat. $11^{\circ} 25'$ S., lon. $52^{\circ} 2'$ E., by the master of the *Shree Rajah Rajaswarree*, who did not take the trouble to sound, in Nov., 1858, are believed to be a false alarm. Probably current ripples induced the master to fancy he was "passing quite close to a reef or bank, with a line of tremendous breakers rolling in from the E., and just reaching the ship in their spent state, causing her to roll and heel over very much, the sea all around the ship, indicating the approach to danger." We only notice them because finding them on Admiralty Charts.

Agalega, or Galega, was examined by Captain Briggs, of H. M. S. *Clorinde*, in Jan., 1811. The landing was found difficult, on account of the heavy surf, the island being surrounded by a reef. A person who formerly had commanded a French privateer was at this time settled on the

* It is to be desired that one of Her Majesty's steamers on the African or Indian stations might settle the question of the existence of this and others.

island, having under him a colony of negroes, who cultivated part of the ground with maize, wheat, &c. This island is little more than a mile in breadth, extending about 11 m. nearly N.W. and S.E., all low land, with a gap in the middle, where the sea breaks through on high tides, which gap gives it the appearance of two islands at a distance. The cocoa-nut trees on it may be seen at 5 leagues' distance. The N. end was found to be in lat. $10^{\circ} 20' S.$, lon. $56^{\circ} 32' E.$ The S. end, in lat. $10^{\circ} 31' S.$, lon. $56^{\circ} 40' E.$, by chronometers of the *Clorinda* and *Minerva* in company. Captain Moresby landed on the N.W. point, and although he had not time to examine the S.E. point, he states that the E. extremity of the reefs extends to lon. $56^{\circ} 42' E.$ At this time a schooner was at anchor in 8 fathoms, water, 2 cables' length from shore, under lee of the N.W. point. This island belongs to Mauritius.

JUAN DE NOVA, or FARQUHAR'S GROUP, extending from lat. $10^{\circ} 5\frac{1}{2}'$ to $10^{\circ} 26' S.$, is supposed identical with the **Twelve Islands** of early navigators; they are the nearest islands (about 130 m. off), N.E. from Cape Ambre. It is a chain of low islets and reefs, consisting of two islands of considerable extent, and ten small ones, making twelve in number, extending N.E. and S.W. 6 or 8 leagues, having a basin in the centre, with 7 or 8 ft. water on the bar leading to it, at the N. part of the chain, where is good ground for anchoring. The soil of these islets is mostly coral, on which grow trees of small size. Turtle and fish of various kinds are plentiful, and some fresh water is to be obtained by digging. Captain Moresby, of H. M. ship *Menai*, 26th July, 1822, anchored at the N. part of Juan de Nova in 17 fathoms, sandy bottom, and made the anchorage in lat. $10^{\circ} 7' S.$ by good observations, lon. $51^{\circ} 5' E.$ by three chronometers. He made the extreme of N. Reef in lat. $10^{\circ} 6' S.$, lon. $51^{\circ} 7\frac{1}{2}' E.$; the N.W. Isle, in sight of the ship, lat. $10^{\circ} 11' S.$, lon. $50^{\circ} 59' E.$; the S. extreme of the reefs in lat. $10^{\circ} 26' S.$, lon. $50^{\circ} 54' E.$ He remained at anchor here till the 29th, turning turtle, the wind fresh from S.E.; the flood-tide then ran N.N.E. $1\frac{1}{2}$ m. per hour, and the ebb to the S.W.; but these were doubtless affected by the ocean current which in July runs to the N.W. Water was got by digging in the sand, at the depth of two butts.

In the month of June, 1855, during the night, the merchant-ship *St. Abbe* was wrecked on one of the reefs of Juan da Nova, becoming a total wreck; it is believed that some of her crew and passengers were carried into captivity at some place on the African coast, to N. of Zanzibar, where some of her spars and timbers were found. At this season of the year the current is strongest to the N.W. about these islands.

St. Pierre Island, in lat. $9^{\circ} 20' S.$, lon. $50^{\circ} 48' E.$, by Captain Robert Moresby, I.N., who visited it, was found to be a low island, about $1\frac{1}{2}$ m. long, bearing W.S.W. from Providence Island: it is peculiar from being cavernous: the sea is thrown a great height through the caverns, appearing at a distance like whales blowing near it. Its formation differs from the neighbouring islands, having a thin bed of soil resting on rock which is neither granite nor limestone. The anchorage for small vessels is close to the reef, the bank not extending a cable's length. Variation $7^{\circ} W.$ The tallest trees on it are scarcely 10 ft. high, but may be seen 5 or 6 leagues off. It is nearly in the same meridian as the W. extreme of the Farquhar group. **A Reef** is said (on the authority of M. Vailheu) to lie about 7 to 9 m. to N.W. by N. of St. Pierre.

Marquis of Huntly, or McLeod Bank, in about lat. $9^{\circ} 55' S.$, lon. $50^{\circ} 25' E.$, marked on the chart with 10 fathoms, is a small bank about 15 leagues to N.W. of the S. point of the Farquhar's, but its position has not been satisfactorily ascertained. It was discovered in March, 1818, by Captain D. McLeod, in the ship *Marquis of Huntly*, with the *Duke of York* in company, bound to Bombay, and is in the fair track from Cape Ambre to the N. Probably this bank is not dangerous, as the ship appeared to pass over the shoalest part, by the water deepening all round, but there was no means of forming a correct opinion of its extent. During the morning no appearance of shoal water or breakers could be discerned from the mast-head, but only ridges of strong rippings at short distances from each other, in one of which the boat found the water much agitated, but no ground was got at 40 fathoms; here the current was found setting strong to N.E., and when out of the rippling, it appeared to set weakly to N.N.W. While in soundings, the ship was surrounded by many sharks and rock-cod, several of which were caught, and the bottom seemed to be white coral rocks in ridges, with apparently deep chasms between them; but from the regularity of the soundings, this must have been occasioned by the various colours of the coral.

PROVIDENCE ISLAND, in lat. $9^{\circ} 10' S.$, lon. $51^{\circ} 10' E.$ (the N. point), is low, about 2 m. in length N. and S.: water is got by digging in the sand. There is anchorage on the W. side $\frac{1}{2}$ m. from shore, upon uneven ground, sand and coral. The tide rises and falls 8 ft.; H.W. at 3 h. 30 m. on the shore, at F. and O. of the moon. The N. part of the Island is covered with cocoa-nut trees, and the S. part with a spongy tree, resembling the fig tree, and growing to the height of 40 or 50 ft. Turtle are plentiful, and land crabs of large size, which are considered palatable and wholesome food. The reef, which surrounds the Island, projects at the N. end 2 or

3 m., and outside it on the N. and W. there seems anchoring-ground (for the S.E. monsoon) in 10 to 17 fathoms. **Wizard Breakers** are said to lie in about lat. $8^{\circ} 50' S.$, lon. $51^{\circ} 13' E.$, or about 8 leagues to N. of Providence Island.

Providence Reef extends about 7 leagues to the S. of Providence Island, and its S. extremity lies in lat. $9^{\circ} 34' S.$, lon. $50^{\circ} 55'$ to $51^{\circ} 2' E.$ Captain Moresby steered N.N.E. 14 m. along the W. side of the Reef at $\frac{1}{2}$ m. off without obtaining soundings, then saw Providence Island, and shortly afterwards St. Pierre. The greatest breadth of Providence Reef, near the middle, is about 2 leagues, by the French account, the whole space within being filled with banks of sand and coral, several of which are above water, so that it is scarcely passable in a canoe at low tide. The French frigate *L'Heureuse* passed in sight of Juan de Nova on the E. side, about 5 leagues off, and on the following night she struck on the S. part of Providence Reef, and went to pieces. The crew got upon a dry sand a league within, from which they scrambled to the island about 7 leagues to the N., to which they gave the name of Providence Island. After having remained two months, the crew, thirty-five in number, left in a boat, which had been lengthened 5 ft.; and with the help of N.E. winds, they landed four days after on Madagascar, 8 leagues to the S. of Cape Ambre.

COSMOLEDO ISLANDS were visited by Captain Moresby, who made the circuit of the group within a mile of the reefs, the *Wizard* passing to the S., and the *Menai* to the N., but did not get soundings at that distance. This group consists of a ring of coral about 10 leagues in circumference, interspersed with islets and banks, enclosing a magnificent lagoon, into which there did not appear a single opening. The S.W. isle was named Isle Menai, in lat. $9^{\circ} 42' S.$, lon. $47^{\circ} 38' E.$; it is more elevated than the others, and has on it some cocoa-nut and other trees. The N. point of the group is in lat. $9^{\circ} 38' S.$, lon. $47^{\circ} 41' E.$ Wizard Island (S.E. end), is in lat. $9^{\circ} 46' S.$, lon. $47^{\circ} 46' E.$ These isles are sometimes resorted to for fish, and a few blacks are left on them, who wait the vessel's return. On the S. side there is a small patch of sand, where small vessels may anchor during the Northerly monsoon.

Astove, or Astore, in lat. $10^{\circ} 6\frac{1}{2}' S.$, lon. $47^{\circ} 48' E.$, and distant 7 leagues to the S. of the Cosmoledo Islands, is a small, low island, upon which the French ships *Le Bon Royal* and *La Jardinière* are said to have been wrecked, 183 m. to the W. of Farquhar's Group.

GLORIOSO ISLANDS are low and small, situated on a reef, about 34 to 39 leagues to the W.N.W. of Cape Ambre. The E. one, **Ile du Lise**, is in lat. $11^{\circ} 32' S.$, lon. $47^{\circ} 34' E.$; and the W. one, **Ile Glorieuse**, in lat. $11^{\circ} 34' S.$, lon. $47^{\circ} 22' E.$ They are covered with brushwood and trees 20 or 25 ft. high, and are about 15 ft. above sea-level, connected by a coral bank nearly 5 m. in breadth in some places, which space is filled with small isles, sand-banks, and lagoons, through which no passage appears; neither could soundings be got with 100 fathoms 1 m. from the reef, on which the sea breaks with great violence. Ile Glorieuse, on which the boat landed, is about $1\frac{1}{2}$ m. long and 1 m. broad; a small basin is formed on its E. end by a curve of the sand-bank, where a small vessel might probably find shelter, in which are 7 fathoms water, but with a rocky and uneven bottom. Turtle and birds are plentiful, but no fresh water, although it might perhaps be found by digging. Ile du Lise is not more than a mile in length, but has a very extensive reef stretching off to S.E. for 4 m. Ile Verte is an islet about a league to S.W. of Ile du Lise. On account of the strength and uncertainty of the currents, these Islands should not be approached but with a commanding breeze. The whole of these dangers appear to extend in an E. by N. and W. by S. direction, about 15 m. The tide rises about 10 ft. Variation $9^{\circ} W.$

Assumption Island, N. point, in lat. $9^{\circ} 40' S.$, lon. $46^{\circ} 35' E.$, by Captain Moresby's observations in Aug., 1822, and distant about $20\frac{1}{2}$ leagues W.N.W. from Cosmoledo Group, is low, with some sand-downs, covered with shrubs, being about 7 m. in length, extending nearly N.N.E. and S.S.W. Mr. Morphey examined it, and anchored on the W. side; on the N. and E. sides it is fortified by a steep coral reef. The hummock on the S.E. point is in lat. $9^{\circ} 46' S.$, lon. $46^{\circ} 38' E.$

ALDABRA ISLANDS, called also Aro, Arco, and Atques, are three in number, joined by islets and rocks, making them appear as one island. A basin is formed between them, having an opening to the N., between West and Middle Islands. East, West, South and Middle are the names by which they are known. **South Island** ranges along the entire S. side of the group, being very narrow, and forming the S. protection to the lagoon. We do not know where the S. Island ends and East Island begins. Between West and South Islands there is a narrow passage with 6 or 7 fathoms, which might (during certain conditions of wind and tide) suit better than the principal entrance, for either coming in or going out.

East Island appeared to lie S.E. and N.W.; the E. end, called Point Hadoul, being in lat. $9^{\circ} 25' S.$, lon. $46^{\circ} 34' E.$ It looks as if joined to S. Island. Breakers project from the E. end of East Island at least 3 m.; and the N. side of this Island appeared to be fronted by several rocks close to shore, with high breakers; otherwise the sea appeared deep and clear of danger. This

Island is of moderate height, here and there a few trees, and a hummock near the E. extreme, close to which the beach is fronted with white patches of sand, and there are other white patches, almost hid by brushwood and verdure, that cover this Island, and give it a beautiful appearance. The gap between East and Middle Island is about $\frac{1}{2}$ m. wide, with breakers stretching across. The chart makes the South and East Islands appear as one.

Euphrates Harbour. **Middle Island** is the highest, the E. part of it being elevated, and covered with very high trees for at least a mile in extent, that may be seen 8 or 9 leagues. The other parts of this Island are well covered with verdure and trees, with some white patches inland and on the beach, which give it a fine appearance. In coasting along this island, the beach seemed to be steep-to, the water not discoloured. The channel between Middle and West Islands is perfectly clear, about a cable's length wide, having 12 or 13 fathoms, with smooth water inside, where any boat might land, there being no surf whatever, and several vessels could lie sheltered from all winds. This was called *Euphrates Harbour* by Captain Cowen of that ship touching here in 1862, outward-bound to Karachi. On account of the smallness of this opening, and the rapidity of the currents or tides, a sailing-vessel could not enter it with the S.E. monsoon; but in the N.-Wester season, entrance is not difficult. With the usual precaution of piloting the vessel from aloft, the shoal *green* water may be distinguished from the deep *dark* water.

West Island is of level appearance, and, although clothed with verdure, has very few trees or bushes of size, like those on the two former islands; but it has, like them, several white patches. The coast of this island is also clear of danger, the N.W. end being fronted by a white beach of at least $\frac{1}{2}$ m. in extent, and it may be seen at 6 or 7 leagues from the deck of a large ship. The N.W. side, in lat. $9^{\circ} 22' S.$, lon. $46^{\circ} 12' E.$, may be approached with safety by night or day.

ALPHONSE ISLANDS are low, of considerable extent, having on them some small trees or shrubs, and surrounded with breakers. Captain Moresby made the N. point in lat. $6^{\circ} 59' S.$, lon. $52^{\circ} 48' E.$ Variation, $5\frac{1}{2}^{\circ} W.$ He rounded this point $\frac{1}{2}$ m. from the reef, which extends $\frac{1}{2}$ m. from the point. The S. extremity of these dangers (Captain Moresby remarked) is fast rising into an island of greater extent than Alphonse; dangerous reefs nearly unite N. and S. Alphonse. There is a passage, but it is very intricate and dangerous, and the currents are strong and uncertain. Turtle abound at this island. About 4 leagues due S. from N. Alphonse, lies a sandy isle or bank, called St. Francis, or S. Alphonse, a little above water, with a reef of high breakers surrounding it, and extending N.E. and S.W. 5 or 6 m. There are no soundings within a mile of the sand. The late Admiral Owen adopted the names of Bijoutier and St. Francis for the S. islands of the group. Their S. extreme is in lat. $7^{\circ} 13' S.$, lon. $52^{\circ} 49' E.$

Cotivy Island and Fortune Bank lie more than 200 m. to the E. of Alphonse Islands. (See page 544.)

THE SEYCHELLE AND AMIRANTE GROUPS.

Mahé, the principal island of the Seychelle Group, is about 200 m. to N.E. of the Alphonse Islands. The principal islands of this Archipelago were explored in 1743 by Lazarus Picault, and named after Mahé de la Bourdonnais, then Governor of Mauritius. These are situated on the middle of a great bank of soundings, Mahé being the largest; Isle Platte, which may be counted amongst the Seychelles, is on a detached bank apparently, but the space between it and Mahé Island has not been sounded. The French have usually fed cattle on these islands, and they colonized those of greatest value with slaves from Madagascar. They are now a British dependency under the Government of Mauritius. The population is between 7,000 and 8,000 souls.

The Archipelago of Seychelle consists of thirty islands: Mahé and those in its vicinity are of primitive rock, with high land generally, and are well watered by innumerable small streams. Several still possess a quantity of good timber, fit for ship-building and other useful purposes. The more distant islands are composed of sand and coral, and are but a few feet above H. W. mark—most of them afford a supply of water, but it is brackish, procured by excavations in the sand. The trees which grow on them are merely fit for fire-wood. The only fruits very common are plantains and pine-apples, though many other tropical fruits may occasionally be obtained; but the Seychelles are most famed for the Cocos de Mer, or double cocoa-nut, that grows on Praslin and Curieuse Islands. Vegetables are scarce, the pumpkin and sweet potato being the most common. Fish is plentiful. The hawks-bill turtle are never eaten at Seychelles; they are, however, taken from May to end of Oct., and are extremely valuable, being the whole source of revenue to many families. The green turtle are common from Nov. to April, and may be purchased for 12 or 41 shillings each. The land-tortoise, which is brought from Aldabra, is a favourite article of food, but has become scarce. Beef and live pigs are cheap; sheep, which were formerly so, are not now

to be procured. Fowls generally a shilling each. Turkeys from 6 to 8 shillings each. Supplies for shipping are not abundant, but might become so if vessels frequently touched here. Near Mahé Town is a very good ship-builder's yard. In the event of a vessel coming here to be repaired, I would recommend her bringing everything but wood and workmen, the supply of marine stores at this small place not being always great.

Seasons. The climate is considered healthy, particularly for children; and, although the thermometer generally stands from 82° to 84° throughout the year, the heat by day is seldom oppressive in the shade. From May to Nov. the S.E. trade-wind prevails, at which season vessels make their passage from hence to Mauritius in about twenty days on an average, and from Mauritius to Seychelles in seven days. During the other months the winds are variable, principally, however, from S.W. and N.W. At this period, fourteen days is a common run from Mauritius to Mahé. Hurricanes* are unknown; but from Dec. to mid-April, the inhabitants do not like sending their vessels to Mauritius. It rains most during the months of Oct., Nov., Dec. and Jan.; and the streams from the ravines on Mahé and Praslin are advantageous for the irrigation of the soil.

The SEYCHELLE BANK of Soundings. It is much to be regretted that this bank (on which so many shoal spots have been discovered) has not been properly explored and laid down on the charts, as Mahé has long been a port of call to ships bound from Malacca Strait, Bengal, Madras and Bombay, making the Southern Passage when the S.W. monsoon prevails to the N. of the equator. (See pages 313 and 315). This plateau of soundings seems to extend from lat. $3^{\circ} 40'$ S. (where its N. limit is well marked by Bird Island) to lat. $6^{\circ} 20'$ S., and between lon. $54^{\circ} 0'$ E. and $57^{\circ} 20'$ E. It is believed that coral heads are growing up here and there, especially at the N.W. margin, where several vessels have come upon very shoal water. Sailing-vessels making the long Southern Passage from Bombay or Bengal to the Red Sea from June to Sept., inclusive (see page 315), may conveniently get soundings on this Bank, and sight Praslin or La Digue Islands, both lofty; then hauling up to the N., they should sight Dennis or Bird Islands, and take a departure for Cape Guardafui.

The N.W. End. H. M. S. *Andromache* got 5 fathoms in lat. $3^{\circ} 51'$ S., lon. $54^{\circ} 53'$ E. Later still, in 1865, H. M. S. *Vigilant* and H. M. S. *Pantaloön* had 7 and 8 fathoms about $2\frac{1}{2}$ to 3 leagues to W.S.W. and S.W. of the above position. The *Swan* whaler belonging to Messrs. Enderby, twice passed over a dangerous shoal, 5 or 6 m. across, with depths of 5 and 3 fathoms, in lat. $3^{\circ} 57'$ E. to $4^{\circ} 1'$ S., and lon. $54^{\circ} 58'$ E.; this danger is called **French Shoal**, because a French ship is said to have been lost there. Again, at 7 m. to S.S.W. of the last, H. M. S. *Vigilant* found more shoal water, of 7 to 9 fathoms; and M. Dupont reported another shoal spot with $3\frac{1}{2}$ fathoms, in lat. $4^{\circ} 15'$ S., lon. $54^{\circ} 28'$ E. Other shoal spots with 7 fathoms, water, are reported as lying 6 leagues to S.W. of the last; and the S.W.-most shoals of the Seychelles Bank, with 7 fathoms, lie in lat. $4^{\circ} 42'$ S., lon. $54^{\circ} 12'$ E., or 40 m. to E. by N. of the African Islands.

The E. side of this Bank has several shoal patches, but none so dangerous as the above. The *Zoroaster* found a shoal of 7 fathoms in lat. 5° S., lon. $56^{\circ} 40'$ E.; at 5 leagues to E. by S. of that the chart has another of 9 fathoms; and at 5 leagues farther to E.S.E., or between lat. $5^{\circ} 10'$ and $5^{\circ} 20'$ S., and between lon. $57^{\circ} 1'$ and $57^{\circ} 6'$ E., soundings ranging from $11\frac{1}{2}$ to 13 fathoms have been taken. In lat. $4^{\circ} 30'$ S., lon. $56^{\circ} 26'$ E., H. M. S. *Forte* sounded in 10 fathoms, only about 1 league within the verge of the Bank, and 40 m. to E. by S. of Praslin, which lofty island would have been visible on a clear day from that position.

MAHE ISLAND, the largest and S.-most of the group that stands on the Seychelle Bank of soundings, abounds with wood; it is lofty, a range of hills running like a spine from N. to S.; the highest part is nearly 2,000 ft. above sea, and may be seen 12 or 13 leagues. Its E. side is bordered by extensive reefs of coral, the openings of which opposite to St. Anne Island form the port, capable of holding five or six large ships of war moored, with sufficient room for small vessels. The anchorage between the coral reefs and St. Anne is excellent, with the centre of St. Anne bearing E. $\frac{1}{2}$ m., the town of Mahé, or Victoria W.S.W., in 8 to 15 fathoms, bottom sand and rock, with a sort of pipe-clay between the rocks, in which the anchor holds well. There are several coral patches between St. Anne and the entrance of the port, having less than 4 fathoms on some parts, which must be avoided by large ships. In the S.E. monsoon the wind never blows hard, and seldom strong. In the N.W. monsoon heavy gusts blow from the land, in which the wind varies: in this season ships might conveniently lie between St. Anne and Ile Moyenne: there is a good passage for small vessels between these islands. A large ship has been known to come to the road of St. Anne between Ile du Cerf and the main; but that S.E. passage is very intricate and

* The ship *Seringapatam*, in Sept., 1851, hove to in a cyclone in lat. 7° S., lon. 58° E., or 200 m. to S.E. or Mahe; the barometer fell 1 in. The Zanzibar cyclone of April, 1872, is another proof that such things occur in this low latitude.

dangerous. During the S.E. monsoon, there is good anchorage on the W. side of Mahé, but heavy gusts come over the high land, when the winds are moderate and steady on the E. side. Water and wood may be procured, either at St. Anne or Mahé: a large boat, loaded, cannot pass over the coral reefs when the tide is low. Sir Edward Belcher, who visited Mahé in Feb., 1842, says that, owing to the transparency of the water, all absolute dangers are visible; and there is a port, or inner harbour, where vessels intending to remain any time, will find the water smoother and without that swell which renders the outer anchorage very unpleasant. Any vessel anchoring near St. Anne Island should run out her stream-anchor astern in the direction of the swell, to prevent the heavy rolling which must result from her being brought broadside to the swell by any sudden flaws of wind off shore during night. A supply of about 150 cattle could be obtained, also a large quantity of rice, and refreshments for the sick at a moderate price. Steamers of the *Messageries Maritimes* have monthly communication between Mahé and Marseilles on the one hand, and Reunion and Mauritius on the other. During the hurricane months at the Island of Mauritius, ships of war, in order to avoid these storms, are sometimes ordered to the Seychelles, as the hurricanes do not approach near to the equator. The Island of Mahé was inhabited by about sixty families, who cultivated cotton, made cocoa-nut oil, collected tortoise-shell, and built small vessels, such as brigs and schooners.

Tides. The flood sets about S.S.W. into Port Victoria, and rises 6 ft.; H. W. at 5 h. 20 m., on F. and C. of moon. Variation, 4° W.

The N.W. point of Mahé Island is in lat. 4° 33' S., lon. 55° 29' E., and a deep bay is formed between that and the W. point. **Conception Island**, rather more than 1 m. off the W. point, is in lat. 4° 39' S., lon. 55° 25' E.; to the N. of this is Cape Ternuy (the W. point), and to E.S.E. about $\frac{1}{2}$ league, stands Therese Island. The W. coast of Mahé affords anchorage in the S.E. monsoon at Port Glau (to E. of Conception) and in Boileau Bay, but under the lee of the island, hard gusts come down from the hills.

The S. point of Mahé Island is in lat. 4° 40' S., lon. 55° 35' E.; but the S.E. point, called Capucin, is a long mile farther E. From Capucin Point the coast takes a N. direction for 7 or 8 m., to Point De la Rue, where the S.E. islet stands $\frac{1}{2}$ m. off, and thence about N.W. to Mahé Town. **Azof Rock** lies $1\frac{1}{2}$ m. to N. by E. of De la Rue Point, and *perhaps* nearly 3 m. to E.S.E. of Ile du Cerf. Vessels should not approach S.E. Islet and Brulee within $1\frac{1}{2}$ m., as sunken rocks are said to lie nearly 1 m. off.

Port Victoria. Mahe is about 16 m. long and 4 broad. On its N.E. side there is a harbour,* now called Port Victoria, secured by reefs from all winds; and farther out is the road, sheltered from E. and S.E. winds by St. Anne and Cerf Islands, but exposed to N. winds. The best approach to the Road is to the N. of St. Anne, the N. point of which may be rounded close, if necessary; but the W. side of the island is lined with a rocky bank reaching $\frac{1}{2}$ m. off shore, which must be avoided. There is good anchorage in 9 or 10 fathoms, with St. Anne's Peak bearing E. $\frac{1}{2}$ N., and the W. point of Cerf Island S. $\frac{1}{2}$ E., about $\frac{1}{2}$ m. off shore. There is also an inner port between coral reefs, called the Barachois, where a vessel can anchor within 1 m. of the town. A good leading mark for the entrance of the Inner Port is Beacon Island, in one with the S. end of St. Anne; in this entrance there are depths of 9 and 10 fathoms.

The **Brisans Rocks** are two *breaking* rocks, lying in deep water, about 4 m. to the N. of St. Anne, and nearly 3 m. off the N.E. end of Mahé Island, having a safe channel within, of 18 and 20 fathoms, water. Neither the Brisans nor the Mamelles should be approached within $\frac{1}{2}$ m.

Silhouette (centre), in lat. 4° 29' S., lon. 55° 17' E., is the highest of the Seychelle Islands, the next to Praslin in magnitude, and nearly circular. It is situated to the N.W. of Mahé nearly 4 leagues: it abounds with timber, and has several families residing on it; the landing is difficult, from the surf which beats over the coral reefs. **North Island** is high, and stands 4 m. to N. by E. of Silhouette, with a good channel between.

PRASLIN is a high island, bearing N.E. 20 m. from Mahé, next to it in magnitude, and about equal in height. The anchorage is in a bay on the N. side of the Island, between Curieuse Island and the main, having a depth of water from 5 to 12 fathoms. It is safe, and well protected from N. winds by Curieuse Island, and sheltered also to the E. by neighbouring islets. Praslin (W. point) is in lat. 4° 17' S., about lon. 55° 44' E., and the watering-place is on the adjacent Island Curieuse: the tide rises 6 or 7 ft. On the hills, the trees are generally hard wood, and cocoa-nut trees are plentiful in many valleys; the *coco-de-mer* grows on this island. The population is about 500 souls, who prepare cocoa-nut oil and cultivate cotton.

Dangers between Mahe and Praslin. The soundings between these islands do not afford

* It is probable that a light-house may soon be erected at the Seychelle Group.

any guide to the position of a vessel. To the N. of the anchorage of St. Anne about 4 m., the **Brisans** are situated, two rocks, which bear from each other S.E. $\frac{1}{2}$ E. and N.W. $\frac{1}{2}$ W. From the N. Brisan about N. by W. $\frac{1}{2}$ m., there is a small coral patch with 6 fathoms. The **Mamelles Rocks**, 40 ft. high, are $\frac{1}{2}$ m. to N.E. of the Brisans. Between the Brisans and the Mamelles the bottom is uneven, having from 11 to 19 fathoms. A cable's length W.N.W. of the Mamelles, there is a rock with 6 ft., on which the sea generally breaks; but, when the weather is fine, it is difficult to be seen: at half a cable from the N. point of the Mamelles lies a sunken rock; and it is also said that to the N.W. of the Mamelles, distant $1\frac{1}{2}$ m., there are several rocks.

Madge Rocks, half-way between the Brisans and Praslin, are two dangerous rocks, covered in high tides, between 2 and 8 cables' lengths apart, N.E. and S.W. In the S.E. monsoon the sea usually breaks high, but when Captain Moresby passed them within 2 cables' lengths, the S.-most appeared now and then above water, and the position of the N.-most was only indicated by the reflux of water. The marks for these rocks are, the highest part of St. Anne on with the Mamelles; the S. part of Digue Island bearing E.; and Silhouette Island W. $\frac{1}{2}$ S. From these rocks E. by N. $\frac{1}{2}$ N. $2\frac{1}{2}$ m., there is a bed of rocks, called **Trompeuse**, from its being often mistaken for those last mentioned. N.E. of Trompeuse, mid-way between it and the N.W. point of Praslin Island, are two islands, called **The Cousins**: between the S. Cousin and Trompeuse, the channel has dangers, which a ship cannot pass with safety; but between the Cousins there is a safe channel, likewise between the N. Cousin and the reef that extends from Praslin. From the N. Cousin N.W. 4 or 5* m., lies a small dangerous rock, called the **Baleine**, covered at H. W. Captain Moresby searched for this rock, but could not find it, not having any decisive marks; it is, however, frequently seen, even with the water's edge at half-tide. From the N. Cousin W.N.W., distant $1\frac{1}{2}$ m., lies a coral patch, having $2\frac{1}{2}$, 3, and 4 fathoms; between which and the Baleine Captain Moresby passed, steering for Booby Island (Ile aux Fous), leaving on the starboard hand a coral patch with 4 fathoms on it, about half-way between Booby Island and the N.W. part of Praslin. Booby Island and Ile Aride lie off the N.W. point of Praslin; and the chart marks some shoals off that point, the outer one being 2 m. S.S.W. of Booby.

Aride Island, in lat. $4^{\circ} 12' S.$, lon. $55^{\circ} 43' E.$, is 5 m. to N. by W. of Praslin N.W. point, and Booby Island stands about half-way between them.

Curieuse, to the N. of Praslin, is a small island of moderate elevation, inhabited only by lepers from all islands subject to Mauritius. The channel between it and Praslin is from $1\frac{1}{2}$ to $2\frac{1}{2}$ m. wide, affording excellent anchorage at all seasons of the year. A coral patch, with 4 fathoms on it, is distant 1 m. from the S.E. end of Curieuse, and a detached rock bears N.W. from its N.E. end. Between Praslin and the Sisters (Les Sœurs, two islets, about $\frac{1}{2}$ m. apart, standing 7 m. to E. of Curieuse), the bottom is generally uneven from 6 to 25 fathoms, but there are safe channels between the Sisters and Ile Felicite: a bed of rocks extends from the Sisters to S., chiefly above water. Ile Ave-Marie is a rock about half-way between Praslin and Felicite, having a shoal projecting S.W. from it about a cable's length. There is a shoal spot about 2 m. N.W. of the W. Sister, and another, called **Mellow Rock**, at 5 m. N. of the same island; both given in the charts on the authority of M. Vailheu.

DIGUE ISLAND, bearing E., 3 m. from the S.E. end of Praslin, is lofty, and next in importance to the latter, with rather fewer inhabitants; it is surrounded by a reef, and the landing is difficult: between it and Praslin, in mid-channel, lie two dangerous rocks, covered at half-tide, distant nearly a mile from each other, S.S.E. and N.N.W. Around the S.-most rock, at a boat's length from it, Captain Moresby had 6 fathoms, and 9 and 12 fathoms at a ship's length: but he thinks a ship ought not to pass between these rocks till the space between them is better known.

Marianne Island, in lat. $4^{\circ} 20' S.$, lon. $56^{\circ} 0' E.$ (the S.E. end), stands 4 m. to E. by N. of Digue, and Felicite lies between their N. points; whilst **The Sisters** are about 2 m. to N. by W. and N.W. by N. of Felicite.

Dangers. From Round Island, off the E. end of Praslin, distant 2 or 3 m. S. by W., and W. by S., 4 m. from S. point of Digue, are two rocks above water, called the **Reguins**, or Alligator and Shark, bearing from each other about N.N.E. and S.S.W., distant 2 or 3 cables' lengths: the S. point of Digue Island on with the S. point of Marianne will lead to S. of them. From Digue Island, 5 m. S. by E., lies a bed of rocks, called the **Chimney Rocks**, in lat. $4^{\circ} 28' S.$; when by them, the W. Sister just touches the E. end of Digue; and to W.N.W. of these, $1\frac{1}{2}$ m., there is a dangerous rock, **Renommée**, covered at half-tide. Most likely many other dangers exist on this

* The chart makes the Baleine Rock to be scarcely 2 m. to N.W. of the N. Cousin, and shows a shoal at 2 m. to S.S.W. of Booby Island, with another off the N.W. end of Praslin. Navigators must give a wide berth to these.

bank of soundings; but the passage between them and Frigate Island appears clear, and is 5 m. broad. In former editions of this book, notice was made that, "about $1\frac{1}{2}$ m. to E. of the Chimney Rocks, there are several rocks at the water's edge, on which the French frigate *Regenerre* was nearly lost; and to the N.E. of the Chimneys, about $1\frac{1}{2}$ m. distant, lie several rocks under water." The Admiralty Chart does not show these.

FRIGATE ISLAND, or *Ile aux Frigates*, in lat. $4^{\circ} 35' S.$, lon. $56^{\circ} 0' E.$ (the S.E. end), is the E.-most of the Seychelle group, elevated 550 ft. above the sea, about $1\frac{1}{2}$ m. in length, having a rocky reef off its S.W. end, over which the sea breaks. This island is inhabited, and has anchorage under its lee: ships running for St. Ann Roads in hazy weather will pass it before they sight Mahé, and sometimes may be as far as *Ile Reciffe* before Mahé is seen. Lelot Islet lies to W.S.W. of Frigate, nearly 2 m. off.

Ile Reciffe, in lat. $4^{\circ} 35' S.$, lon. $55^{\circ} 49' E.$, elevated about 150 ft., and $1\frac{1}{2}$ m. in length, has a remarkable rock, like a building, on its summit, the resort of millions of birds, which make it appear white. With this rock bearing S.S.E. $1\frac{1}{2}$ m., the *Menai* anchored in 17 fathoms, sand and shells: the soundings, between it and St. Anne Island, are 17 to 28 fathoms, with great overfalls. *Ile Reciffe* is 10 m. to W. of Frigate Island.

DENNIS, or *Orixa*, the N.E. island of the Archipelago, in lat. $3^{\circ} 49' S.$, lon. $55^{\circ} 44' E.$, is about $1\frac{1}{2}$ m. in extent N. and S., with several thatched habitations on its N. side; it is very low, covered with trees, and seen from a ship's deck about 4 leagues. A reef appeared to project from its S. end nearly a mile, with discoloured water beyond it; and a coral bank or spit extends from it to the N. 2 m., upon which H. M. S. *Curlaw* struck. In approaching from the S.E., the soundings at 3 and 4 leagues are from 25 to 30 fathoms, sand, coral, and shells; and when the island bears from S.W. to S. about 5 m., you are off the bank of soundings. If you suddenly shoal under 10 fathoms in passing, immediately haul out to the N. or N.E. From 10 fathoms the soundings gradually deepen as you stand to N.W., and the bank slopes down to 40 fathoms, when the island disappears from the deck. As this island is near the N.E. extremity of the great Seychelle bank of soundings, it is convenient for a ship to make, when proceeding by the *Southern Passage*, for the Arabian Gulf (see pages 313 and 315), there being no danger in steering towards it in the night, if the lead is kept going, which will give timely warning of your approach to it in any direction.

BIRD ISLAND, or *Sea-Cow*, the N.-most of the Seychelle Islands, in lat. $3^{\circ} 40' S.$, lon. $55^{\circ} 16' E.$, is a small, low, sandy isle, with a few shrubs, and surrounded by a reef, about $1\frac{1}{2}$ m. in length. There is anchorage off it in moderate depths, the bottom rocky, mixed with sand. When this island was explored by the *Eagle* cruiser from Bombay, many sea-lions, probably Manutees or large seals, were seen on the beach, with birds innumerable. A bank extends from the S. end, having 9 fathoms, sand and coral, at 6 m. distance from the island. *L'Hirondelle*, French privateer, was lost on it, having sailed the preceding day from Mahé, to cruise in the Red Sea. They procured water by sinking a pit in the sand, remained there twenty-two days, and part of them got to Mahé on a raft; the edge of soundings extends to the N. of Bird Island about 3 m.

The **AMIRANTE ISLANDS**, the S.W. group of the Seychelles, consist of several detached small islands, coral reefs, and banks. The Amirantes differ little from each other, being generally from $1\frac{1}{2}$ to $2\frac{1}{2}$ m. in length, situated on coral banks, and seldom exceeding 20 or 25 ft. in height; but they are crowned with trees, rising 20 or 30 ft. above the land; and lately cocoa-nut trees, planted by negroes from Mahé, are become abundant. Only two of these islands have resident negroes upon them, and the population altogether does not count 100 souls. By digging 12 or 14 ft., water may generally be obtained. Calms, and uncertain currents, with the want of good anchorage, make it desirable not to approach these islands in large ships, unless in necessity.

Eagle Island, called by the French *Remire*, is in lat. $5^{\circ} 8' S.$, lon. $53^{\circ} 30' E.$, was examined by the *Eagle* cruiser, and is a low, sandy island, about $1\frac{1}{2}$ or 2 m. round, covered with shrubs, and having reefs to the N. and E., 2 and 3 m. from the shore, on which the sea breaks very high. Between these reefs and the island there is a channel, with soundings in it from 9 to 14 fathoms. There is no fresh water on the island. The tide rises about 9 ft., H. W. at 5 h., on F. and C. of the moon. Variation $5^{\circ} W.$

African Islands, two in number, are very small and low, about 6 leagues to N. of the bank which surrounds the Amirante Islands, and were discovered by some of the small French vessels which belong to and navigate in these parts. Captain Adams, of H. M. S. *Sybilie*, examined them, after the wreck of H. M. schooner *Spitfire*, in 1801, and found a few shrubs on them. They are almost overflowed at high spring-tides, and abound with turtle and aquatic birds, but are destitute of fresh water. The largest island is the S.-most, joined to the other by a sand-bank, which is dry at L. W., spring-tides: their length from N. to S. is not above 2 m. On their E. side is a reef of

breakers, and on the W. side there is safe and commodious anchorage in a bay formed by the isles and the reef which joins them. The N. island is in lat. $4^{\circ} 52' S.$, lon. $53^{\circ} 31' E.$; the position of these islands, and the bank on W. side of all the Amirantes requires examination. The tides rise about 8 ft., H. W. at $9\frac{1}{2}$ h., on F. and C. of moon. These islands lie about 6 leagues to the N. of Eagle Island; and 4 m. N.W. by N. from the latter there is said to be a reef; also, a bank extends 4 or 5 m. from the S. end of the African Islands, with 5 to 9 fathoms on it; but there is a safe channel between them and Eagle Island, through which the *Mary* passed, and afterwards steered to the E., between the Seychelle Islands and the isles on the S. part of the bank, without perceiving danger.

Ile de Neuf (Isle Nine), in lat. $6^{\circ} 19' S.$, lon. $53^{\circ} 13' E.$, is the S.-most of the Amirante Islands, very small, and covered with bushes. **Marie Louise Island**, 7 m. E.N.E. from Ile de Neuf, is also woody and small, surrounded by a reef, on which there is a quarter less 4 fathoms, 2 m. W. from the island. Captain Moresby passed in the *Menai*, between these islands, in soundings of 12, 15, and 17 fathoms, and continued the latter depth, steering N.E. 3 m.

Ile Boudouse, in lat. $6^{\circ} 6' S.$, lon. $52^{\circ} 58' E.$, is on the W. extremity of the Amirante Bank, and, like the two islands last described, is small, crowned with wood: they are all surrounded by coral reefs, excepting a few narrow openings. Ships should use a chain if they anchor among these islands. The white sandy bottom may be distinguished by the coral patches, when in 12 to 15 fathoms, water. **King Ross Island** was mentioned by M. Vailheu of the French war-vessel *Madagascar* in 1834, as being about 5 leagues to N. of Boudouse, and it is on the charts.

Ile l'Etoile (Star Island), in lat. $5^{\circ} 53' S.$, and bearing about N.N.W., 8 leagues from Marie Louise, is about $1\frac{1}{2}$ m. in length, low, and covered with bushes; the surrounding reef projects to the S. about a mile, and to the N.N.W. of the isle there is a bank with breakers on it.

Iles Poivre, in lat. $5^{\circ} 43' S.$, lon. $53^{\circ} 23' E.$, are two small islands, within a mile of each other, in an E. and W. direction, bearing N. by E. from Ile Marie Louise. Reefs extend around them to a considerable distance, and 7 or 8 m. to the N. there is a bank, dry at L. W.

Ile de Roches, in lat. $5^{\circ} 41' S.$, lon. $53^{\circ} 45' E.$, or 22 m. E. of Poivre, has a bank extending around it about 4 leagues to the N. or N.W., and 2 leagues to the E., with only $2\frac{1}{2}$ fathoms on it in this part, and mostly from 5 to 13 fathoms to the N.W.; but in a S. direction the bank extends only a small distance from the isle.

Ile St. Joseph, in lat. $5^{\circ} 27' S.$, and 4 or 5 m. E. of Ile de Ros, according to the observations of Mr. Russell, of H. M. S. *Topaze*, who explored most of these islands in a small vessel, while the frigate lay at Mahé during the Mauritius hurricane months. The descriptions and positions here given of the Amirante Islands and others are from observations of Mr. Russell, or Captain Moresby, which correspond with each other, but differ much from the positions assigned to them by the French. We doubtless need a much more detailed examination of all these islands and banks.

Ile de Ros, in lat. $5^{\circ} 24' S.$, is nearly on the meridian of Eagle Island. To the N. of it about 3 m. is the S. extremity of a shoal-bank, marked with 2 fathoms in that part, from thence stretching nearly to Eagle Island, with soundings of 4 to 9 fathoms. When Ile de Ros bore S.E. 12 m., Lieut. Hay found $4\frac{1}{2}$ fathoms, rocky bottom, then steered N. by W. 3 m., and was off the bank. Sand-banks and coral reefs extend far W. of St. Joseph, making the channel between that island and Ile de Ros narrow and dangerous.

ISLANDS and BANKS to S. of the SEYCHELLES. **Ile Platte** is in lat. $5^{\circ} 48\frac{1}{2}' S.$, lon. $55^{\circ} 28' E.$, by Captain Moresby, who passed 3 m. to the E. of it, and had no bottom with 100 fathoms; but off its S.W. end a bank is said to extend 4 or 5 leagues, having from 2 to $2\frac{1}{2}$ fathoms, sand and coral. From the N. part of the island a reef extends to the N. and N.W. $3\frac{1}{2}$ m., and also about 2 m. from the other parts of the island. This island is composed of coral, and is about $\frac{1}{2}$ m. in length.

Cœtivy Island (centre), in lat. $7^{\circ} 10' S.$, lon. $56^{\circ} 20' E.$, is low and sandy, but covered with palm trees, extending N.W. and S.E. $3\frac{1}{2}$ m., having off the N. and N.W. points, in the S.E. monsoon, anchorage on a bank of sand stretching $\frac{1}{2}$ m. from the shore, in 7 to 17 fathoms. His Majesty's ship *Menai*, touched here in April, 1822, and found abundance of turtle: water may be procured close to the anchorage. The reef extends far to the S. Captain Malfie carried on a manufactory of cocoa-nut oil here in 1811. Mr. E. Taylor, the commander of the ship *Simlah*, having called at this island for water on his voyage to Bombay, states that a coral reef extends from the S.W. point of the island, on which the sea breaks as far as he could see from the poop of his ship, and, according to the testimony of a resident, to the distance of 9 m.; and from the N. end of the island another reef extends 2 m. He recommends rounding the N. point at the

distance of at least 3 m., and to be careful not to stand too far to the S.W., as there are some shoal patches in that direction from the anchorage. He procured supplies of good water and coconuts, and states that vegetables and fowls may be procured. A coral bank with 11 fathoms is shown on the chart about 3 leagues to N.W. of Cœtivy.

Adelaide Bank is thought to be situated about 15 leagues N.E. from Cœtivy; and **La Constant Bank** is in lat. $6^{\circ} 19' S.$, lon. $56^{\circ} 25' E.$, has 11 fathoms, about N.N.W. 6 or 7 leagues from Adelaide Bank. **Success Bank** is said to be in lon. $56^{\circ} 40' E.$ Captain Moresby thought these banks unite on the meridian of $56^{\circ} 35' E.$, between lat. $5^{\circ} 10'$ and $5^{\circ} 40' S.$, and that they are a continuation of the Grand Mahé Bank.

Fortune Bank, named by Kerguelen after his vessel *La Fortune*, which anchored on the bank in 14 fathoms, sand, being apprehensive of driving upon some *sand-bank*. The multitude of sharks about them made the sea luminous like breakers; of these they caught above fifty, and a great quantity of crabs, with which the sea was covered. When daylight appeared, no danger was discernible. This bank was discovered 31st May, 1770, by the *Verelst*, Captain Compton, who found the N.E. end of the bank to be in lat. $7^{\circ} 11' S.$ Immediately after losing soundings, the sea regained its proper colour, with the usual swell. Numbers of ground-sharks were seen during the time they were on the bank. The *Surat Castle*, on her passage from Mauritius to Madras, crossed over this bank, in from 15 to 10 fathoms, least water, coral rocks and coloured shells. An appearance of breakers was seen on the W. edge, with strong rippings round it. The space, over which soundings have been obtained, lies between lats. $7^{\circ} 11'$ and $7^{\circ} 25' S.$, and lons. $56^{\circ} 45'$ and $57^{\circ} 15' E.$ Small traders have found 9 fathoms, in lat. $7^{\circ} 18' S.$, lon. $57^{\circ} 15' E.$; but whether it be one large bank, or three distinct shoal patches, we do not know. The *Sir Stephen Lushington*, after passing the island Cœtivy, next day got upon Fortune Bank, and carried soundings of 10 to 12 fathoms, steering E. for 7 m.; coral rock and sand were plainly visible under the ship; by observations taken on the bank, it was found to be in lat. $7^{\circ} 7' S.$, and 31 m. E. of the island Cœtivy by chronometers. This is the same part of the bank where the *Wasp*, in 1866, sounded in 13 and 14 fathoms. The India ship *Abercrombie Robinson*, Captain J. Innes, in April, 1830, carried regular soundings from 10 fathoms, the least depth, to 17 fathoms, water, steering N. by E. about 5 or 6 m. over the N.W. edge of the bank, *supposed*, which part was found to be in lat. $7^{\circ} 6' S.$, lon. $56^{\circ} 50' E.$ About 45 leagues to the N. from Fortune Bank, in about lat. $5^{\circ} 12' S.$, there is another bank according to the French, with soundings on it from 13 to 31 fathoms; this is the E.-most discovered bank on the Seychelle plateau.

MOZAMBIQUE CHANNEL.

W. COAST OF MADAGASCAR—WINDS, CURRENTS—THE CHANNEL PASSAGE.

(VARIATION, AT CAPE ST. MARY, AND EUROPA ISLAND, TO ZAMBESI RIVER, $19^{\circ} W.$; AT COMORO ISLANDS, $11^{\circ} W.$)

The **Mozambique Channel**, or Inner Passage, formed between the Coast of Africa and the Island of Madagascar, is in the narrowest part, nearly opposite to the town of Mozambique, about 74 leagues wide, but much broader at the S. part, opposite to Cape Corrientes.

Cape St. Mary, the S. extreme of Madagascar, is in lat. $25^{\circ} 39' S.$, lon. $45^{\circ} 7' E.$;* the vicinity of the cape is lofty and seen afar off. The coast from Cape St. Mary, to the E., towards Fort Dauphin, is mostly bold, with depths of 40 and 50 fathoms, about 4 or 5 m. off shore, on a bank of regular soundings that fronts the S. part of Madagascar, which is here mountainous. From Cape St. Mary to the W., as far as **Point Barrow**, in lat. $25^{\circ} 15' S.$, lon. $44^{\circ} 22' E.$, the depths are usually 14 or 16 fathoms about 2 or 3 m. off shore, and a bank of regular soundings, **Star Bank**, extends along the coast between these headlands, projecting from 5 to 9 leagues off shore, with depths of 27 to 30 fathoms on its outer edge, about 14 leagues W. from Cape St. Mary, and 8 leagues S. from Point Barrow: from this outer extremity it narrows towards the coast, forming a convex outline.

Star Reefs, distant from $2\frac{1}{2}$ to 4 leagues W.S.W. and S.W. of Point Barrow, consist of several detached coral reefs with high breakers on them, extending nearly N.N.E. and S.S.W. from lat. $25^{\circ} 17'$ to $25^{\circ} 25' S.$, and in lon. $44^{\circ} 18' E.$ Tozer Patch, in lat. $25^{\circ} 12' S.$, lon. $44^{\circ} 14' E.$, a part of these reefs, lies $7\frac{1}{2}$ m. N.W. of Point Barrow, and $3\frac{1}{2}$ m. W.N.W. of **Leven Island**, the latter being a high isle, surrounded by a reef, about $4\frac{1}{2}$ m. N.W. by N. of Point Barrow, and

* The longitudes are $5'$ to the E. of those given by Admiral Owen, as the longitude of the Cape of Good Hope Observatory is ascertained to be $18^{\circ} 28' 45'' E.$, instead of $18^{\circ} 23' 36'' E.$, as assumed by him.

Croker Bay is formed to the N. of the point. There is a passage inside the Star Reefs, with 16 to 8 fathoms near Point Barrow, also between the latter and Leven Island: the soundings are from 8 to 5 or 4½ fathoms in Croker Bay. This part of the coast should not be approached in the night, because the Star Reefs are very dangerous, partly above water, and distant upwards of 4 leagues from land; these reefs are steep-to, on the W. side, with high breakers. Her Majesty's ship *Intrepid* had no ground at 150 fathoms, when 3 m. off; when about 7 m. off, the land was in sight from the mast-head. To the N.W. of Star Reefs, in lat. 25° 3' S., near the coast, lies **Barracouta Island**, which is small, surrounded by rocks and breakers, with soundings of 12 and 14 fathoms inside, between it and the coast-reefs that extend 2 m. off shore in this part. There is a small port between coral reefs, opposite this island.

Ships intending to touch at St. Augustine Bay, or to make the land to the S. of it, should not approach the coast to S. of lat. 24° 30' S., as that part in the vicinity of the Star Reefs is little frequented. From this latitude to St. Augustine Bay, the direction of the coast is generally about N. by E., having a fronting reef 2 or 3 m. from shore, upon which the sea breaks high in most places. The land is of middling height near the sea, and high in the interior.

ST. AUGUSTINE BAY has at the entrance **Nos Vey**, or **Sandy Island**, in lat. 23° 38' S., lon. 43° 38' E., a small, low island, about 2 m. from the S. shore, with shrubs on it, and a white sandy beach. A ship coming from the S., for St. Augustine Bay, should steer along shore at 2 leagues' distance; when it is approached, the high land about it will be seen, which near the sea is of middling height, but much higher at some distance inland; a table-hill, called Westminster Hall, a considerable distance in the country, will be discerned on the N. side of the bay. When Sandy Island is perceived, a course must be steered to pass it on the N. side, where a ledge of rocks projects upwards of a mile to the N.N.W., and nearly 1 m. from the W. and S.W. sides, it is fronted by foul ground, steep on the W. side; but a bank of irregular soundings extends about 2 and 2½ m. to N. of the island. A ship may borrow on this bank to 12 or 13 fathoms in passing Sandy Island, to avoid the shoals on the N. side of the bay, on which the sea breaks in stormy weather. In running to the E. from Sandy Island, soundings may be preserved by steering towards the first low sandy point on the S. shore, from which a reef projects ½ m., with breakers usually on it. There are 9 and 10 fathoms, water, close to the breakers, and 14 or 15 fathoms at 2 cables outside, from whence it deepens gradually to 28 fathoms, and at a small distance farther out, no soundings.

The S. shore of the bay is low and sandy to the Tent Rock, which is in lat. 23° 35' S., lon. 43° 46' E., an isolated rock, below H. W. mark, about half a cable's length to the W. of the steep cliff at the water's edge, which is the W. end of the high land on the S. side of the river. The S. shore is lined by a reef, covered at half-tide, but the constant surf usually shows the limit of danger, except near the E. part, where two rocks are situated on its outer edge; these are always visible when the tide is not high, appearing at three-quarters flood, or one-quarter ebb, like two small boats or canoes; but they are covered at high spring-tides. From these rocks, the reef converges toward the shore near Tent Rock, leaving a bank of soundings to the N., which is the proper anchorage. A swatch in the reef, with 16 or 17 fathoms close to it, makes the soundings not a certain guide in passing along; for ships have struck on this part of the reef, by hauling in towards it, when they could not get ground with the hand-lead.

With the sea-breeze, which usually sets in about mid-day, a ship, after passing Sandy Island, may steer direct for the bottom of the bay, keeping a moderate distance from the edge of the reef; at other times, when the wind prevails from the S.W. and S., she ought to pass the breakers off the low sandy point in 14 or 15 fathoms, and the swatch in the reef may be passed in 21 fathoms, there being 34 fathoms, water, about 2 cables' length farther out, and then no soundings.

Between the swatch and the two rocks which appear at three-quarters tide, the reef is nearly steep-to in some places, but a ship may steer along, getting a cast at times, in 29 or 30 fathoms. There are 12 fathoms a small distance outside of the two rocks, and 30 fathoms N. ¼ E. from them about 3 cables off, from whence the bank shelves suddenly into deep water. A ship should continue to steer to the E., with the N. point of river bearing about E. ¼ S. till Westminster Hall is on with a low sandy point on the N. side of the bay, bearing N.E. ¼ N.; she will then begin to get into tolerably regular soundings on the bank, and the two small rocks on the edge of the reef will bear about S.W. The depth decreases somewhat gradually on the bank, from 26 fathoms near the outer edge, to 9 and 10 fathoms toward Tent Rock.

The anchorage is in 8 to 12 fathoms, the Tent Rock bearing S. ¼ E. to S. ¼ W., good holding-ground, which is the best situation, and where there is most room. No ship should let go an anchor in more than 15 or 16 fathoms, unless it is with Tent Rock bearing S. ¼ E., and then in not more than 18 or 20 fathoms, for the bank shelves off suddenly from 24 fathoms in most places. The

Intrepid, in 10½ fathoms, had Tent Rock bearing S. ¼ W. off shore a short mile. The anchorage abreast the Tent Rock is about 6 m. distant from Sandy Island.

A ship should moor E. and W., that she may ride between the two anchors with an open hawse when the wind blows strong from the N., which sometimes happens; in some places, if she moor N. and S., the outer anchor would be in very deep water. During the N.E. monsoon it is considered dangerous to lie in this bay, the Northerly and N.W. winds, which prevail much in that season, blowing directly into it, accompanied by a heavy swell. High water on F. and C. of moon at 4 h. 30 m. Rise of tide 13 ft. Variation, 18° W.

Onglahe River, called by the English Dartmouth River, opens into St. Augustin Bay. The N. point of this river is a steep bluff, and the S. one, which is also steep, has a low woody point terminating it to the N. The river can only be entered by a ship's boat at half-flood. Some Frenchmen have lately settled 2 or 3 leagues up the river, where cattle are procurable. They export salt beef to Re-union and Mauritius. Wood and water are got near the entrance of the river. The *Intrepid* towed her water on board in rafts, but found it tedious, the distance being nearly 3 m., and several casks were lost on the bar by the surf. At L. W. spring-tides, the depth on it is only 2 ft., and the stream runs almost constantly down the river, although the perpendicular flow of tide is 12 and 13 ft. on the springs. Alligators are seen in it at times. Ships generally get a good supply of bullocks, sheep, and poultry at this place; but it has been customary to give the King of Baba a present when a large supply is wanted, to induce him to encourage his people to trade: vegetables are scarce. The inhabitants are hospitable, but subtle and prone to revenge.

Tullear Harbour, about 4 leagues to the N.E. of Sandy Island, is formed by a rocky bank running parallel to the shore, within which there is anchorage near a small river. The coast from the point N. of St. Augustine Bay to this river is fronted by a reef (on which the India ship *Winterton* was wrecked, by standing too near the land in the night), and it forms the E. side of harbour. The outer reef lies above a league from shore in some places, and is steep to outside. The entrance to the harbour, round the N. end of outer reef, is about a mile wide, with 14 to 18 fathoms, water, decreasing in depth as you approach the anchorage, which is in 6 and 7 fathoms near Tullear Town; but the bottom being rocky, this place is not frequented; however, native pilots can take a vessel in. The S. entrance is rocky and more intricate.

The *Arabella* sent her boat ahead to sound, and followed into the N. passage leading into Tullear Harbour, least water 6½ fathoms on the bar, then deepened gradually to 12 fathoms, keeping nearest to the S. shore, and steering S.S.E. to bring Westminster Hall to bear about S.E.; afterwards anchored in 6 fathoms, ooze, mid-channel between shore and breakers, the latter bearing N.W., distance off shore 1 m., and had 7 fathoms within a cable's length all round the ship. Procured some bullocks, and at 6 a.m., weighed with a land-breeze at S.E.; least water 8 fathoms in running out over the bar. Variation in 1859, 18° W.

Manombo River is next to Tullear; the anchorage off it, called Ranou-beh, is good holding-ground according to Captain de Langle, but we need better surveys of this coast. The coast from Tullear Bay to the N. continues to be lined by reefs, at 2 or 3 m. distance in some places.

Murderers Bay, in lat. 22° 12' S., lon. 43° 18' E., is very shoal inside the entrance, where there are from 3 to 5 fathoms between the reefs, but only a few feet water inside, although the Bay is 3 or 3½ m. in extent; a reef projects about 2 m. from the high land on the S. side of the mouth of this Bay. Murder Island lies about 8 m. to the N. of Murderers Bay, and a reef projects 2 m. from it to the S. and S.W., and 1 m. to the W. **Grave Island** is 7 m. farther N., in lat. 21° 57' S., also fronted by a reef; and two detached reefs, called Bowie Reef and Parsons Reef, are in a direct line between these islands. These islands and reefs are distant about 2½ m. from shore, having a channel with from 6 to 12 fathoms, water, betwixt them and the reef that lines the coast. When engaged on the survey of the coast in 1824, Mr. Bowie and Mr. Parsons, midshipmen of H. M. S. *Barracouta*, under Admiral Owen, were assassinated by the natives on Murder Island, and buried on Grave Island; these appropriate names were given to the islands, instead of First and Second, as formerly marked on charts.

CAPE ST. VINCENT, in lat. 21° 54' S., lon. 43° 20' E., and 5 m. E. by N. of Grave Island, has the River St. Vincent, or Joune-a-Minty to the N., fronted by islands and reefs, the outermost reefs being about 2 leagues distant from shore, with no soundings outside, till close to danger. The Cape is also fronted by a detached reef, extending 4½ m. parallel to the coast, having betwixt it and the shore-reef, a narrow channel with from 3 to 5 fathoms, water, and there are 14 or 15 fathoms between its S. extremity and the reef surrounding Grave Island. To the N. of these dangers, the coast continues to be fortified by reefs, having a bank of soundings from 12 to 8 fathoms, extending 5 or 6 m. off; and in lat. 21° 20' S. the land trends E. for about 6 leagues,

and is formed of many broken points and inlets, with contiguous shoals, and soundings of 9 to 15 fathoms within 8 or 4 m. of the limit of danger.

Crab Island, in lat. $21^{\circ} 4' S.$, is 10 m. off shore, and **Barlow Island**, in lat. $20^{\circ} 50' S.$, is nearly the same distance: these islands are small, fortified by reefs, with patches of reefs between them, and other patches lie in a N.N.E. line from Barlow Island, as far as lat. $20^{\circ} 40' S.$ There is a passage with from 15 to 6 fathoms, water, between the coast and these isles and reefs, which appear to be situated on the verge of the bank of soundings, for there is no ground with 100 fathoms a little to the W. of them. All the coast hereabout is low, and from lat. 21° to $20^{\circ} S.$, extends in a N.N.E. direction, with a bank of irregular soundings from 7 to 20 fathoms, projecting 4 and 6 leagues off shore; and in lat. $19^{\circ} 55' S.$ about 10 leagues off, there is a bank with 16 fathoms, water.

MOUROUDAVA, in lat. $20^{\circ} 18' S.$, lon. $44^{\circ} 19' E.$, is a place where some trade was formerly carried on, and where a ship may get refreshments. Water is procured in the rivers adjacent to the road. The anchorage is in $8\frac{1}{2}$ or 9 fathoms, with a remarkably high tree bearing E.S.E. near the sands which bar the Rivers Youle and Mouroudava. This place is seldom frequented by European ships, being exposed to N.W., S.W., and W. winds. The *Cordelière* reported a shoal with 9 fathoms, in lat. $20^{\circ} 8' S.$, lon. $43^{\circ} 41' E.$, nearly 13 leagues to W. of Mouroudava.

The coast from Mouroudava continues low, with shoals to Parcelas River, in lat. $19^{\circ} 35\frac{1}{2}' S.$, at the bottom of a bay, wherein lies the village of Soit Rann. The river is large, bringing down the heavy rains from the central mountains of Madagascar. The crew of a wrecked French ship, *Marie Caroline*, are said to have been murdered in this bay. From Parcelas River it takes a N.W. direction to lat. $19^{\circ} 8' S.$, then about N. by E. $\frac{1}{4}$ E. to $18^{\circ} 51' S.$, opposite to which part the S. limits of danger on the Parcel or Barren Islands Bank commence.

The Parcel, or Parcela Bank of soundings extends a great distance from the coast of Madagascar, having several dangers over it, some of which are about 7 leagues from the coast. The S. limit of this bank is a little to the S. of the Barren Islands, and it reaches nearly to Cape St. Andrew: the soundings on it are in many places very uneven, the bottom being generally composed of coral and sand; and the W. edge is steep to sea-ward.

BARREN ISLANDS, about seven or eight in number, are small and low, with white sandy beaches, and shrubs on them: reefs and breakers project from some of them, with other detached reefs far from them; betwixt which, and also among the islands, there are soundings from 7 to 15 or 16 fathoms. The S.-most danger, called the **South Sand**, is placed by Owen in lat. $18^{\circ} 41' S.$, lon. $44^{\circ} 1' E.$; the South Island in lat. $18^{\circ} 34' S.$, lon. $43^{\circ} 56' E.$; the North Island in lat. $18^{\circ} 18' S.$, lon. $43^{\circ} 46' E.$; the North Sand in lat. $18^{\circ} 3' S.$, lon. $43^{\circ} 54' E.$; the West Breakers in lat. $18^{\circ} 16' S.$, lon. $43^{\circ} 44' E.$ Heavy breakers were also seen in lat. $18^{\circ} 2' S.$, lon. $43^{\circ} 44' E.$, about 3 leagues to the W. of the North Sand, and this part is better avoided as unknown and dangerous. These islands and reefs being on the S. and W. edge of the Parcel Bank, several ships have been in danger of running on them in the night, when steering for the edge of the bank.

Caution. Experience has proved that the neighbourhood of these islands is very dangerous, and that neither they nor the S.W. part of the bank ought to be approached without great caution; a ship should haul out instantly to the W., if she happen to get soundings on this part of the bank.

Koora Kyka is a small place, in lat. $17^{\circ} 53' S.$, to the S.E. of Coffin Island, where a ship may anchor, and procure water in case of necessity. Close to the N. of this place lies the small River Vulla, directly opposite to Coffin Island; and 8 leagues farther N. is the River Manumbaugh, in lat. $17^{\circ} 11' S.$ Between Coffin Island and the coast there are irregular depths of 14 to 8 fathoms near the island, shoaling to 6 and 5 toward the coast. If a ship intend to pass through this channel, or to anchor at any of these places, caution is requisite, to avoid the coral patches along the W. coast of Madagascar. The tides set strong through the channel between Coffin Island and the main land.

COFFIN ISLAND, or **Savou**, in lat. $17^{\circ} 29' S.$, lon. $43^{\circ} 45' E.$, is small and low, of black appearance, with a white sandy beach: it has been mistaken for the island Juan de Nova, by several navigators in passing, from their not having seen the adjacent coast of Madagascar, which hereabout is low near the sea, but inland has a conical volcanic peak, and is generally mountainous. This island is 10 m. from the coast, and dangerous to approach on the N.W. and S.W. sides, as shoal detached coral banks project there 5 and 6 m., and its surrounding reef runs off 1 and $1\frac{1}{4}$ m. At 2 leagues to the N.W. of it, there is a bank called Vulla Sand, nearly covered at H. W. spring-tides, with two detached reefs between the latter and the island, having overfalls from 18 to 4 fathoms around and betwixt them.

Doubtful Shoal. The *Taunton Castle*, in 1791, struck on a bank of coral and sand in $3\frac{1}{4}$ fathoms, in the act of sounding. This coral patch was not found by the officers under Captain

Owen, although they searched for it with the *Taunton Castle's* cross-bearings; but such shoals are difficult to find. When aground, Coffin Island bore E.N.E. about 5 m., and a sand-bank N.N.E. about the same distance. To the N.W. the water was found to be very shoal, but deepened fast to the S.W. A small anchor being laid out in this direction, the ship was hove into deep water: the tide had flowed 13 ft. when the ship floated, the sand-bank then nearly covered, just visible from the mast-head, the tide setting 2 m. an hour to the N.E. It is certain that the ship struck somewhere, but the bearing of Coffin Island was *probably wrong*; for the vessel's cutter was sent to examine the bank to the S. and E. of the island. To the E., between it and the Madagascar shore, the depths decreased to 5 and 6 fathoms, soft ground, in mid-channel, shoaling as the island or the coast was approached to 3 and $3\frac{1}{2}$ fathoms, hard ground: the water in it was thick, containing a quantity of weed, and the tide set strong through it to the N.

The soundings near the island, by Owen's survey, are 16, 14, and 12 fathoms, decreasing to 8 and 6 fathoms in mid-channel; which latter depths continue at the distance of 4 or 5 m. from the coast, both to the N. and S. of Coffin Island, although there are patches of 4 or 5 fathoms in some places. Variation 14° W.

The Porpoise Reef, even with the water's edge, lies in lat. $16^{\circ} 54' S.$, about 3 or $3\frac{1}{2}$ leagues from the coast. The *Dart* found a 3-fathoms shoal about 15 m. to N. of Porpoise. The Parcel Bank, as already observed, along the S.W. and W. verge, is generally steep, having a sharp declivity from 30 or 35 fathoms to 50 and 60 fathoms, no ground.

Chesterfield Island, or Sand-Bank, the centre, in lat. $16^{\circ} 17' S.$, lon. $43^{\circ} 55' E.$, is said to be about a mile in length E. and W., and 10 to 15 ft. above the sea; having on it a rock, with a patch of reddish sand to the E. of it, on which the sea breaks furiously, though the weather be moderate. In a direction about W. $\frac{1}{2}$ N. from the shoal, for 13 or 14 leagues, a line of soundings, from 22 to 18 fathoms, was taken; and from 22 to 18 fathoms were found in a N.N.E. direction for $7\frac{1}{2}$ leagues from the shoal; but beyond these soundings, this N.W. verge of the Parcel Bank has been little examined. The barque *Euphrates*, in 1862, is said to have noticed a breaking reef extending about 4 m. off its W. side.*

In running to the N., the Chesterfield Shoal may be avoided by keeping outside the bank of soundings, or by just venturing to get a cast of deep soundings at times, on the N.W. verge of the Parcel Bank. Proceeding to the S., this shoal may be avoided in the same manner, by keeping outside, or by sighting Juan de Nova.

Soundings off the Coast. The plateau of soundings, called the Parcel Banks, extends fully 10 leagues to the W. of Coffin Island; then its margin runs up about N., passing 8 or 9 leagues to the E. of Juan de Nova; and it is *apparently* the same bank which continues N., and is found more than 20 leagues to W. by N. of Cape St. Andrew.

JUAN DE NOVA, or St. Christopher Island, in lat. $17^{\circ} 3' S.$, lon. $42^{\circ} 48' E.$, has in most old charts been marked as two islands, at a great distance from each other; the Dutch, however, seem to have known that only one island did exist at a distance from the coast of Madagascar in this part of the channel, which is called Juan de Nova in Van Keulen's chart. It is $2\frac{1}{2}$ m. in length, and about 8 or 9 leagues to the W. of the edge of the Parcel Bank; great numbers of aquatic birds seen generally in its vicinity. It may be seen about 4 leagues from the poop of a large ship, or 6 leagues from mast-head, having a small central elevation, covered with shrubs. The Portuguese call it San Joao da Nova.

Soundings. Off the E. end, shoal and breaking water extends $4\frac{1}{2}$ m.; and to the W. also, for 1 m. or more. Anchorage, during the S.W. monsoon, may be had to N.E. of the island, at $1\frac{1}{2}$ m. or 2 m. off, in 7 to 10 fathoms, sand; this bank shows itself by the lighter colour of the water.

CAPE ST. ANDREW, in lat. $16^{\circ} 11' S.$, lon. $44^{\circ} 31' E.$, is about 29 or 30 leagues to the N.E. of Manumbaugh River; being the N.W. extremity of Madagascar, the land from hence takes an E. direction. The N.W. coast of Madagascar from this cape to Cape Ambre had for a century been little known to English navigators, until Captain David Inverarity explored the harbours, and nearly the whole of this part, during a trading voyage along it, in 1802. And in 1824 and 1825, the coast-line and harbours were examined and surveyed by H. M. ships *Leven* and *Baracouta*, under the command of Captain W. F. Owen. Captains de Langle and Jehenne, of the French Navy, have added much to our knowledge since then. The *Grenouille* French ship reported a shoal about 11 leagues to N.E. by N. of Cape St. Andrew.

The Coast at St. Andrew, and to the E., is low, and said to be fronted with trees; but towards Boyana Bay there are downs of a reddish colour. This is a part of the kingdom of Iboina,

* We should be thankful for better accounts of Chesterfield Bank and Juan de Nova Island.

or Boueni (Boyana). Captain Wilson, R.N., says that "the import slave-trade is still carried on (though to no great extent) from the E. coast of Africa in Arab dhows. These vessels take in their slaves probably somewhere about Angoxa River; then cross over to Cape St. Andrew, and exchange them for cattle (at the rate of four head of cattle for one slave) with the neighbouring petty chiefs; these cattle are sold to the French at Nos Beh, after which the dhows go to Ozsanga (a fine, large bay and river abreast of Nos Beh), and there load with rice, which cargo is taken to Zanzibar or Quiloa."

Caution. "From the imperfect way in which the coast has been surveyed, it is most dangerous navigation; and past experience tells us that, in the event of shipwreck, the natives are not to be trusted. Steamers will soon open up this part of the world, when the value of Madagascar will be fully appreciated. The coal-beds, known to exist in the N.W. side of the island, will then become valuable, and one great difficulty in the navigation of Mozambique Channel be overcome."

BOYANA BAY entrance, or the N.W. point, called **Table Cape**, is in lat. $15^{\circ} 59' S.$, lon. $45^{\circ} 23' E.$, being about E. from Cape St. Andrew. This bay is about 3 m. wide in the entrance, and 6 or 7 m. in length, extending S., with depths from 6 to 4 fathoms, which shoal to 2 and 1 fathom near the shore and at bottom of the bay, around which there are several small villages. At the N.E. angle of the bay there is a cove or circular basin, nearly filled with shoals, but in the entrance there are 2 and 3 fathoms, with 6 or 7 fathoms, water, a little way inside at low tide, and the rise is 15 ft.; H. W. at $4\frac{1}{2}$ h. on E. and C. of the moon.

False Cape, in lat. $15^{\circ} 46' S.$, lon. $45^{\circ} 43' E.$, is a rocky headland, about 4 leagues to the S. of which lies the mouth of Boteler River, fronted by numerous banks and shoal flats, but has 8 and 9 fathoms, water inside, in some places. **Makumba River**, about $5\frac{1}{2}$ leagues more E., in lat. $15^{\circ} 46' S.$, lon. $45^{\circ} 59' E.$, is also fronted by shoal banks; but there is a channel with from 4 to 10 fathoms, water, near the E. shore, going in a S.W. direction, then round the E. point to S.E. and E., where a vessel may anchor land-locked in $4\frac{1}{2}$ to 6 fathoms, water.

BEMBATOOKA BAY is large and safe, Majunga Point, on the E. side of entrance, being in lat. $15^{\circ} 48' S.$, lon. $46^{\circ} 20' E.$ The entrance is about $3\frac{1}{2}$ m. wide, clear of danger; the depths irregular, from 18 or 20 fathoms to 7 and 6 fathoms in some places, particularly near Point Sareebingo, on the E. side, inside of which is the village Majunga, or Majunghai. The depths from the entrance, by keeping more than mid-channel towards the W. side of the bay, are from 10 to 20 fathoms to Tandava Point, which is about $2\frac{1}{2}$ leagues within, on the E. side, having a reef extending around about 1 m. from shore, and along the E. side of bay: reefs also front the W. shore opposite to Tandava Point. **Bembatooka Town**, or **Bombetok**, is on the S. side of this point, where ships may lie land-locked, sheltered from all winds, in 4, 5, or 6 fathoms, close under the point near the town. From Bembatooka, the bay widens and becomes a basin, shoaling about 3 m. within its entrance, and at the head several rivers discharge themselves, having islands fronting their entrances. Ikapa River, the largest, is said to flow near Tannarivo, the capital of Madagascar, and may perhaps be improved at some future day for commerce. Bembatooka Bay is an eligible place to refresh a fleet of ships. Bullocks are plentiful at two dollars each; rice, and other articles, may also be procured at reasonable prices.

Majambo Bay, the W. point bears E.N.E. from Bembatooka Bay, distant about 50 m., and is in lat. $15^{\circ} 12' S.$, lon. $46^{\circ} 59' E.$ The entrance is about 5 m. wide, narrowing gradually to 2 m., where, at the distance of 3 leagues within, it opens into a capacious basin or inner harbour. Soundings in the outer bay are irregular, from 9 to 35 fathoms, and those in the inner harbour more irregular, though very deep in places; the greater part of the basin being shoal, except under its W. entrance-point (Point Tchinsamansey), where there is anchorage in from 8 to 10 fathoms, land-locked, and sheltered from all winds. This bay has several rivers falling into it, with a table-hill near the rocky point on the E. side of the entrance. The tide flows here on F. and C. to $4\frac{1}{2}$ h., and rises 16 ft. Her Majesty's ship *Lyra*, in 1864, found a 3-fathoms shoal, about 5 m. to N. by W. of the W. point of Majambo Bay; and H. M. S. *Vigilant* found another with $4\frac{1}{2}$ fathoms, about 6 leagues to W. by N. of the same point.

Port Mazambo, in lat. $14^{\circ} 54' S.$, lon. $47^{\circ} 19' E.$, and about 9 leagues N.E. of the above, appears by Owen's survey to afford good shelter for moderate-sized vessels; having from $2\frac{1}{2}$ to 7 fathoms in the outer part, with 4 and 5 fathoms, water, inside the island, at the mouth of the port or basin, where vessels might anchor in safety from all winds; but a shoal, with $3\frac{1}{2}$ and $4\frac{1}{2}$ fathoms, lies about 3 leagues to the N.W. of the entrance.

NARREENDA BAY entrance is between the island of Nos Sancassee to the N.E. and Moormona Point on the W. side; the latter bearing N.E. $\frac{1}{2}$ E. from the W. point of Majambo Bay, distant about 15 leagues. The N. point of Nos Sancassee is in lat. $14^{\circ} 31' S.$, lon. $47^{\circ} 35' E.$;

and between the reef that fronts it and Moormona Point, in lat. $14^{\circ} 41' S.$, which is also fronted by a reef, the entrance into Narreenda Bay is full 2 leagues wide; the rocky **Souhee Islet**, rising straight 200 ft. out of the sea, marks well the E. side of the entrance channel; this islet should not bear to the S. of S.E. (as a vessel enters from the N.), to avoid the shoal water off the S.W. point of Nos Sancassee. The general direction of the bay is about S.W. $\frac{1}{4}$ S., extending about 8 leagues inland, and is 8 or 9 m. broad near the entrance, and 5 or 6 m. in breadth at the village Narreenda, situated on the banks of an inlet near the bottom of the bay on the E. side. The general depths are 15 to 11 fathoms near mid-channel, and along the W. shore; 5 fathoms toward the bank on the E. side; and 4, 5, and 6 fathoms where the anchorage is, opposite the village of Narreenda, where the governor resides. The deepest water is near the W. shore.

Tides. High water occurs at $4\frac{1}{2}$ h., on F. and C. of the moon; rise of tide 15 ft.

Nos Saba Island lies 3 leagues to N.N.E. of Nos Sancassee, and nearly 4 m. off the coast. H. M. S. *Lyra* found a $3\frac{1}{2}$ -fathoms shoal mid-way between these two islands, and other shoal water extends some miles to the W. of that. We therefore advise ships, when coming from the N., not to allow the E. extreme of Cape Moormona to bear to the W. of S. by E., till Souhee Islet bears S.E. There are passages (but a dangerous navigation) for small vessels between Nos Sancassee and the E. shore, formed by reefs which surround the two small islands that lie off the mouth of Luza River: this river has 2 fathoms on the bar at L. W., with great depths inside, forming an excellent harbour, and its entrance is in lat. $14^{\circ} 37' S.$, lon. $47^{\circ} 43' E.$, about 7 m. to S.E. of Nos Sancassee.

RADAMA ISLANDS, or **Nossy Lava**, four in number, between lat. $14^{\circ} 13'$ and $13^{\circ} 56' S.$, are of considerable size, particularly **Nossuvee**, the central one, which fronts Port Radama at 3 leagues from its entrance: Point Blair, in lat. $13^{\circ} 59' S.$, lon. $47^{\circ} 58' E.$, bounds the entrance on the N. side, and Point Inverarity to the S.; both have extensive reefs projecting far out from them, and several shoals and reefs front the entrance of **Port Radama**, with others inside, and lining its shores; but there are depths from 7 to 15 fathoms in the fair channel of this port, which is an inlet of the sea from 4 to 3 m. wide, extending first to the S.E. by E. about 3 leagues, and then to the S. a great way inland. Martahoola Peak, a magnificent land-mark, stands 10 leagues to E.S.E. of Port Radama. **Raminotoc Bay**, formed to the S. of Point Inverarity, is extensive, with several shoals; its S.W. extremity, Point M'Cluer, being in lat. $14^{\circ} 15' S.$, lon. $47^{\circ} 49' E.$; and Nossambilleha, the S. Radama Island, fronts the mouth of this bay, having a passage on either side of very irregular depths, from 20 to 5 or 6 fathoms. **Rafala Bay** is formed on the N. side of Point Blair, and the great reef that projects 4 m. N.W. by W. from this point; reefs also stretch along the shores on both sides of this bay, which extends about 2 leagues inland, with depths usually from 9 to $4\frac{1}{2}$ fathoms near the upper part.

Shoals. There are several shoal patches, with only $2\frac{1}{2}$ or 3 fathoms, water, on them, for 2 leagues outside the Radama Islands, which render great caution necessary in any ship passing along this part of the coast, or intending to enter any of the bays, even with the best chart. The outermost shoal (found as yet) is one of 3 fathoms, lying 3 leagues to N. of Nos Saba Island, and between that shoal and Nossuvee there are several others. Casts of 4 and 5 fathoms are given about 2 leagues to the W. of the N. point of Nossuvee.

Besides the above, between Nossuvee and the shore to N. of it, a $3\frac{1}{2}$ -fathom shoal is discovered in mid-channel. In fact, the N. entrance to Port Radama requires a careful examination.

Kranza Island, in lat. $13^{\circ} 54' S.$, lon. $47^{\circ} 47' E.$, stands close to N. of Nossuvee, and the N. entrance to Port Radama is along the E. sides of these islands, but the large-scale plan is needed, if going in without a pilot.

Bermahomy Islands (the N.W. part), in lat. $13^{\circ} 33' S.$, lon. $47^{\circ} 51' E.$, are low woody islets on a coral reef, distant about 7 leagues to N.N.E. of Radama Islands, and standing about 4 m. off the great and lofty peninsula that intervenes between Port Radama and Passandava Bay. A reef extends some distance to S. of these Islands, and a detached shoal about $2\frac{1}{2}$ leagues to the S. by W.

Passage Island, in lat. $13^{\circ} 28' S.$, lon. $48^{\circ} 0' E.$, off Dalrymple Bay, lies $3\frac{1}{2}$ leagues to N.E. by E. of the Bermahomy Islands.

DALRYMPLE, or BAVATOUBE BAY, in lat. $13^{\circ} 30' S.$, lon. $48^{\circ} 2' E.$, the entrance being near the N. peninsula on the W. side of the great bay, Passandava. It has from 8 to 12 fathoms in the entrance, which is $\frac{1}{2}$ m. wide between the reefs; from 6 to 9 fathoms inside, and is recommended as particularly safe and commodious for wooding, watering, and refitting ships. When coming in, keep nearest to the W. point of the entrance, which has, about $2\frac{1}{2}$ or 3 m. to the N.W., a small island called Passage Island, near the N. point of the land: when it bears W. $1\frac{1}{2}$ m., the course is directly S. into Dalrymple Bay, which abounds with fish, but is not inhabited; a ship may anchor either in the S.E. or S.W. arm of the Bay, in from 6 to 9 fathoms, mud.

Winds. When the S.W. monsoon prevails to the N. of the equator, and the S.E. trade-wind is most constant and strong off Cape Ambre from May to Oct., a sea-breeze from N.W. blows into Passandava Bay during the day, from 9 h. or 10 h. a.m. till nearly sunset. The Southerly monsoon is called the fine-weather season, and generally free from gales; but a fresh breeze for ships to work against, when going down the centre of Mozambique Channel. Vessels bound from Port Radama, or from Nos Beh to Mauritius at this season, should work down Mozambique Channel, and passing round Cape St. Mary should get into the latitude of Westerly winds, and so make Easting in lat. 25° to 30° S. Off the S. end of Madagascar you generally get the Fort Dauphin or E.N.E. winds, and sometimes, about Dec. or Jan., an occasional W. wind may blow for several days together between Madagascar and Mauritius.

Gales. April seems a treacherous month near Mozambique (*see* also pages 106 and 116), for a hurricane occurred there on April 1st and 2nd, 1858. Also at Zanzibar, on April 15th, 1872, a disastrous hurricane drove many ships and native vessels ashore. These hurricanes appear to have been local. (*See* also foot-note at page 540.) A French ship, *Le Colibri*, was lost in a violent tornado blowing off shore through the gaps in the high land to the S.E. of Nos Beh.

The promontory that forms the W. side of Passandava Bay, is very lofty; its highest part, **Round Mountain**, in lat. $13^{\circ} 38'$ S., lon. $48^{\circ} 0'$ E., is about 2,500 ft. above sea, and stands 3 leagues to S.E. by E. of the Bermahomy Islands; and, farther to S.E., there are other peaks (about 2,000 ft.), which look down upon Passandava Bay. To the E., and to the S. of Passandava, there are still loftier mountains, Martahoola Peak being the grandest, and perhaps 5,000 ft. high; and gusts of wind sometimes come down from between these hills.

PASSANDAVA BAY is a large and deep bight on the E. side of the peninsula, extending in a S. by E. direction to the distance of 6 leagues. Off the E. point of the Bay lies the large island of Nos Beh, between which and the point is the smaller island of Nos Cumba, with an islet called the **Nine-pin**, about 4 m. S. of the former and W. of the latter, in lat. $13^{\circ} 28'$ S., lon. $48^{\circ} 15'$ E. At the head of the Bay, in lat. $13^{\circ} 45'$ S., lies Passandava Town, about 2 m. off which the depths are 4, 5, and 6 fathoms, increasing to 20 and 22 fathoms towards the entrance, but not always regular. The great channel is to the W. of the islands, but there is a passage to the E. of them, by which small vessels may enter the Bay. Variation 9° W. in 1859. High water at 5 h. on F. and C. of moon; rise of tide 16 ft. There is a watering-place on the W. side of the Bay, inside of the Mamooka Isles, which are small, with shoals projecting to the N.W. of them. Bullocks and refreshments, wood and water, may be procured in great plenty, and on reasonable terms, at most of the above places. The inhabitants are shy to strangers, until acquainted with their business; but they seemed to be an inoffensive, fair-dealing, and hospitable people.

NOS BEH ISLAND, about 3 leagues in E. and W. diameter, and 4 leagues from N. to S., is an important French * settlement to the N. of Passandava Bay. **Hellville**, the principal town at present, is at the S. side of the Island, but a swell rolls into its bay with W. winds. Other bays around the Island afford shelter from different winds. The Island has considerable elevation in many detached hills; but that at the S.E. end, which looks down upon Hellville and adjacent little bays, is upwards of 1,400 ft. above the sea; and to the S. of this peak, about 4 m. off, stands the summit of Nos Cumba Island, which is 600 ft. high. The passage between these two islands is choked by shoals, and no stranger should attempt it, but a vessel coming from the N., along the E. side of Nos Beh, might anchor in 9 or 10 fathoms in Marbacool Bay, about a league to N.E. of Nos Cumba, and get a pilot for Hellville.

The **W. Entrance to Nos Beh Port** and Passandava Bay, has a clear channel, more than 1 league broad, to N. of Passage Island, in lat. $13^{\circ} 28'$ S., lon. $47^{\circ} 59'$ E. A large ship coming from the S., should pass about 2 m. outside the Bermahomy Islands and keep on a N.E. by N. course till Passage Island bears to the S. of E., then she may steer E. by N., and pass that island about 1 m. off. Several shoals lie off the W. side of Nos Beh Island, and to a distance of 10 m.; the outer patches (having 12 ft.), are 6 m. to N.N.E. of Passage Island; to avoid them, when running in, a vessel must have the lofty S.E. peak of Nos Beh bearing between E. and E. $\frac{1}{4}$ S.; with that peak bearing E. by S., she will be too close to danger on the N. side of channel.

Nos Cumba is a round island, whose central peaks bear S.E. about 6 m. from Hellville. This island is a good leading mark into the bay, and so is the **Ninepin Islet**, which is about 5 m. to W. of Cumba, and the same distance to S.W. by S. of Hellville Bay. The Ninepin may be approached to $\frac{1}{4}$ m., but there is said to be a shoal between it and the W. entrance, which requires caution, although the French surveyors sought for it in vain. The Bay of Marbacool lies to the E. of Nos Cumba, with a good channel between it and Damooty Point, which is on the main land,

* Nos Beh will be found on Admiralty chart, No. 706, of Passandava and Marbacool Bays.

about 5 leagues to the N. by E. of Passandava Town. The depths throughout Passandava Bay are great; and although it is a magnificent bay, it is too open to allow of its being represented as affording safe shelter to the whole navies of Europe. But two or three safe anchorages exist along its W. shore; these are to the E. of Dalrymple Bay, and known as **Bararata Anchorage**, and the **watering-place** inside of the Mamooka Islands, which are 6 leagues to S. by W. of Nos Beh.

Marbacoal Bay, situated close to the N.E. of Passandava Bay, formed by Nos Beh and Nos Cumba on the W. side, and on the E. side by Chimpaykee Island and its adjoining peninsula, has depths from 12 to 5 fathoms, and appears to afford good shelter; but the wide Bay of Chimpaykee, on the E. side of the peninsula and island of this name, is open to N. and N.W. winds.

SHOALS off NOS BEH. **Castor Bank** is a long shoal, lying in an E.S.E. and W.N.W. direction, and between 10 and 15 leagues to N.W. of Nos Beh; its depths are 7, 9, and 10 fathoms. **The Levan Bank** is to N.E. of Castor, and possibly forms a portion of the same, but has nothing less than 17 fathoms, though it is extensive, and has soundings of 20 and 24 fathoms at 18 leagues to N. by W. of Nos Beh Island.

Coast Soundings. H. M. S. *Castor*, in 1852, found shoal soundings of 8 fathoms about 8 m. to N.W. of the Great Minow Island. A 5-fathoms-shoal was also found at 6 m. to N. by W. of **Nos Fanihi**, the square islet, in lat. $13^{\circ} 12' S.$, which lies to the N. of Nos Beh. Therefore, we advise mariners, when coming from the N., not to approach either the Andromache or Minow Islands, or Nos Beh within 4 or 5 leagues.

THE MINOW ISLANDS extend from lat. $13^{\circ} 3' S.$ to $12^{\circ} 43' S.$, the outermost being 7 leagues distant from the land; the N. end of Great Minow Island is in lat. $12^{\circ} 49\frac{1}{2}' S.$, lon. $48^{\circ} 39' E.$, from whence it extends in a narrow ridge S.W. by S. about 3 leagues, and here forming an acute angle, turns to the N.W. by N. about 5 m. farther, in a ridge of the same breadth, which is about 1 m. There are several reefs amongst the small isles to the S. and S.W. of Great Minow Island, with depths mostly from 10 to 20 fathoms between the isles; and between them and the coast, 14 fathoms, decreasing to 6 and 5 fathoms toward the latter. **Green Island** lies in the channel inside of these isles, about 2 leagues off shore; and the N.-most, or Little Minow Island, is 7 m. to the N.E. of Great Minow. Chimpaykee Bay is to the S. of Green Island, and to E. of Chimpaykee Island; the soundings in it are regular.

Cape St. Sebastian, in lat. $12^{\circ} 26' S.$, lon. $48^{\circ} 46' E.$, is the extremity of a crooked peninsula, that projects about $3\frac{1}{2}$ leagues from the main land, formed of peaked hills, and having a large deep bay on the E. side of the peninsula, with two small bays on the W. side, one of which is 3 m. to the E. of the extremity of the Cape: several isles front the latter bay, and two reefs or sandy isles lie off the mouth of the large bay to the E.

Andromache Islands bear about W. by N. from 3 to $4\frac{1}{2}$ m. from the Cape, and between them there is a channel with 18 to 24 fathoms, water. Joseph Island, 3 m. N. of Cape St. Sebastian, and nearer the N. point of the peninsula, has a narrow bank of 4 to 6 fathoms off it towards Woody Island, to the extent of 3 m., on each side of which bank, and round the island, the general depths are 10, 15, and 19 fathoms. **Woody Island**, in lat. $12^{\circ} 16' S.$, and lon. $48^{\circ} 40' E.$, is 7 m. N.N.W. from Joseph Island, having irregular depths near it of 5 to 14 fathoms, and 7 fathoms overfalls about 3 m. outside of it, on the edge of the bank of soundings; there are also 4 fathoms overfalls on the edge of the bank, about $4\frac{1}{2}$ leagues to the W. of the Cape, rendering great caution necessary in ships which approach this part of the coast; but the depths farther in upon the bank usually increase to 30, 35, and 20 fathoms, irregular soundings. The chart shows a *doubtful* shoal, called Intermediate Bank, at 5 or 6 leagues to W. by N. of Andromache Islands.

CAPE AMBRE is about 15 leagues N.E. by N. from Cape St. Sebastian; the coast for greatest part of the distance forms a very wide bay, named William Pitt Bay by Captain Owen, in which are several islands and shoals near the land, and others 3 or 4 leagues off, on the verge of the bank of soundings, and nearly in a direct line of E. by N. from Woody Island towards the low peninsula that forms the W. side of Liverpool Harbour; there are many 4 and 5 fathoms' patches, and the following sands above water:—**Delight Sand**, in lat. $12^{\circ} 18' S.$, lon. $48^{\circ} 49' E.$; **Magnet Sand**, in lat. $12^{\circ} 18' S.$, lon. $48^{\circ} 55' E.$; and **Moresby Island**, about 2 leagues farther to the E.N.E.; and Hay Island off the N. extreme point of Pitt Bay, which is also fronted by rocky shoals: inside of which two bays are situated, with depths of 7 to 4 fathoms, the E.-most was called Port Chancellor by Captain Owen. The low peninsula, that forms the N.E. boundary of Pitt Bay, bears S.W. by W. 15 m. from Cape Ambre, and the face of the intermediate coast is pretty straight, but three good ports are found along it.

Ports Liverpool, Jenkinson, and Robinson, are three deep inlets discovered by Captain Owen, the shores of which are lined by reefs; but they afford safe shelter for ships. The entrance of Port Liverpool is in lat. $12^{\circ} 3' S.$, lon. $49^{\circ} 12' E.$, with from 16 to 22 fathoms, water, decreasing

to 9 and 7 fathoms near the upper part of the harbour, which is about 4 m. to S.E. from the entrance. Port Jenkinson, distant about $2\frac{1}{2}$ m. N.E. from Port Liverpool, has depths 7 to 10 fathoms at the entrance, decreasing to 5 and $4\frac{1}{2}$ fathoms at the upper part, which is about $1\frac{1}{2}$ m. S.E. from the entrance, and is altogether much more contracted than Port Liverpool. Port Robinson is in lat. $12^{\circ} 1' S.$, distant $1\frac{1}{2}$ m. N.E. of Port Jenkinson, and about 2 leagues to the S.W. of Cape Ambre, being nearly $\frac{1}{2}$ m. wide, with depths of 8 and 10 fathoms, and nearly the same inside, to the upper end of the harbour, $1\frac{1}{2}$ m. to the E.S.E. of the entrance; this seems to afford complete protection from the wind and sea; but Port Liverpool is the most capacious of these harbours, being about $\frac{1}{2}$ m. wide in the entrance between the reefs, opening to a spacious basin a little way inside.

From Cape St. Andrew to the N. end of Madagascar, a bank with soundings extends along the whole of the coast, projecting from it 2 or 3 leagues in some places, and in others to the distance of 8 or 9 leagues from shore. Ships drawing more than 12 ft. water, should be very careful in approaching the edge of the bank, where in many places there are only 3 fathoms, coral. Several of these coral flats are of considerable extent, and generally situated on the verge of the bank of soundings: it is therefore requisite to keep a good look-out from the mast-head for discoloured water, or keep a boat ahead sounding.

ISLANDS AND DANGERS IN MOZAMBIQUE CHANNEL.

Bassas da India, often called formerly Europa Rocks, were seen by the *Europa*, Dec. 24th, 1774; this dangerous reef is 7 or 8 m. in diameter, between lats. $21^{\circ} 26'$ and $21^{\circ} 32' S.$, and lons. $39^{\circ} 41'$ and $39^{\circ} 32' E.$ The largest of the rocks appeared about the size of a long-boat, with the sea breaking over them, which makes it a very dangerous reef, for there are no soundings until very close to the rocks. Captain Huddart saw it in the *Royal Admiral*, Aug. 23rd, 1784. Nothing was perceived above water, except scattered rocks like hay-ricks, though probably some part of the flat may dry at L. W.; at the exterior part, the sea breaks heavily all round. The India ship *Kellie Castle*, on her passage to Bombay, saw this danger, May 21st, 1821, and passed to the W. about 6 m. distant. When the small rocks, like hay-cocks on the N.E. end of the shoal, bore E. by S., a large rock E.S.E. (with a long dry sand-bank extending to the S.W.), the S.W. end of the shoal then bore S.S.E., with high breakers on this part; and the limits of the danger were distinctly seen, except to the E.

This danger was named by the Portuguese discoverers, *Baxios da Judia*, or the Banks of the Jewess; and still called so by that nation, as well as by all European navigators, except those of our country, where the first charts of these parts, copied from the Portuguese, substituted the word India, for Judia. **Pilot Shoal**, about in lat. $21^{\circ} 10' S.$, lon. $39^{\circ} 2' E.$, with 3 fathoms only, is a danger that lies about N.W., and 11 leagues from Bassas da India.

EUROPA ISLAND, in lat. $22^{\circ} 22\frac{1}{2}' S.$, lon. $40^{\circ} 24' E.$, is about 3 or 4 m. in diameter, of circular form, with an indentation on the N. side; highest at the N. part, with several small hummocks in other places, and a sandy beach fronting the sea; and it may be seen from the mast-head at the distance of 5 or 6 leagues in clear weather. It is covered chiefly with brush-wood, excepting some trees on the N. end, which made that part of the island look more elevated than the rest, although these trees were far from lofty. The island had a beautiful white sandy beach, with the appearance of being safe to approach, as nothing like a reef or breakers could be discerned; but a reef projects half a mile or more from the S. end of the island. Owen describes the island as easy of access, and abounding in turtle. He also found it much larger than hitherto supposed, and suggested that it should be called Europa Island, and that Europa Rocks should be named Bassas da India.*

Mid-Channel Passage. It has been already remarked, that the mid-passage through the Mozambique Channel seems preferable to that along the Madagascar shore, when ships are certain of the longitude; but caution is requisite, when the parallels of Bassas da India, Europa Rocks, and Juan de Nova are approached in the night; for a ship might be close to the breakers before they were perceived, particularly in hazy weather, which prevails in this channel. Neither should the African coast be approached close, on account of S. currents and baffling winds, often experienced there. (See African coast, pages 92 to 95.)

Although the mid-channel track was seldom frequented, from a dread of the Bassas da India and Europa Island Rocks, it appears preferable to the route along the Madagascar shore, when the navigator is confident of his longitude; for many ships have been in great danger by falling in unexpectedly with straggling islets or reefs near the coast of Madagascar. With a steady wind at

* In former editions of this Directory, the names of Europa Island and Bassas da India were interchanged; they will now be found as represented on the Admiralty charts.

S. or S.S.W., the track to the W. of the Bassas da India and Europa Rocks seems preferable to that along the coast of Madagascar, it being clear of dangers. If a ship approach the African coast, she may be subject to light winds and S. currents; but in mid-channel the monsoon is generally strong, and more steady, than on either side of it; although in April, and early in May, the best winds will be found by steering between Comoro and the African coast, rather to the W. of the mid-channel track.

Juan de Nova Island, or San Joao da Nova, will be found described at page 549.

COMORO ISLANDS, AND ADJACENT DANGERS.

The four Comoro Islands lie nearly mid-way between the N. extreme of Madagascar and the African coast; Comoro, the largest and highest of these islands, giving its name to the group: the others are Mohilla, Mayotta, and Johanna: they are all very high, and may be seen from 14 to 20 leagues in clear weather. The inhabitants are Mahometans, descendants of Arabs mixed with Africans, and generally found to be courteous and hospitable; but the natives of Comoro appear not to have merited this character when the India ships first traded to India, for the *Penelope* had part of her crew enticed on shore, and destroyed by the inhabitants of this island.

COMORO, or Angazecha, the highest, is about 11 leagues in length, N. and S., and 4 leagues broad; Comoro Mountain, near its S. end, is 8,500 ft. high, a noble land-mark; the whole island is volcanic, and some craters are frequently in activity. The anchorage at this island is inconvenient, and water not easily procured; European ships now prefer Johanna and Mayotta, though formerly they sometimes touched here for supplies. The anchorage is at the N.W. part of the island, said to be in lat. $11^{\circ} 18' S.$, lon. $43^{\circ} 22' E.$, about $1\frac{1}{2}$ or $1\frac{1}{4}$ m. to the W. of Muchamahola, the King's Town, opposite to a small sandy beach; but it is not advisable for a ship to anchor under 30 to 35 fathoms, water, for in this depth she will only be distant from the breakers about 2 cables' length. Excepting the anchorage at the N.W. end, the island is generally steep, having no soundings at a small distance from shore; there are, indeed, two small bays, called Ingando and Moroon, to the N. of the S.W. point, where the bottom is coral, and the depth 35 fathoms within a cable's length of breakers; but no vessel should anchor there, without sending a boat to examine the place, more especially as a reef of breakers extends from the S.W. part of the island to a considerable distance, with shoal coral patches beyond the breakers, upon which a ship returning from Bombay to England a few years ago was nearly lost.

Vailheu, or Devonshire Shoal, with least water 4 fathoms, is said to lie 10 m. to W. of the S.W. point of Comoro, and shoal water has been reported to extend for 12 m. farther to the W.

If a ship intend to anchor at this island, she ought to have the boats prepared to tow when it is approached, for she will be liable to baffling light airs and calms, the high land obstructing the regular monsoon, and the tides, which are strong, may be liable to drift her past the anchorage, if precaution is not taken to counteract their impulse. The town of Muchamahola is large, with many cocoa-nut trees, and a sandy beach; at low tide a boat cannot land, as shoal water extends $\frac{1}{4}$ m. from the town, which is the only landing-place. Steering for the anchorage, a boat should be sent ahead to sound, for the bank is steep, and the distance small, from 35 fathoms on its outer edge, to 12 fathoms close to the breakers. Ships might be sheltered from the Southerly monsoon; but it would be dangerous with strong N.W. winds, which, however, seldom happen. We know too little of this place to recommend it; the French man-of-war *Prudente* visited it, but reported unfavourably of the anchorage. Bullocks, sheep, goats, and tropical fruits are plentiful, but no water can be procured; it is prudent to give the king a present when a supply is wanted. High water on F. and C. at $4\frac{1}{4}$ h.; the tides are strong, and rise about 12 ft. on the springs.

The S.E. point of Comoro is in lat. $11^{\circ} 54' S.$, and lon. $43^{\circ} 34\frac{1}{2}' E.$, bears S. by E., 3 leagues from the mountain. Variation $10\frac{1}{2}^{\circ} W.$ **Maroon, or Maroni**, in lat. $11^{\circ} 41' S.$, lon. $43^{\circ} 18' E.$, seems as good a place as any, to obtain supplies of fresh meat and water, in the N.E. monsoon; but ships have to anchor in 25 fathoms, less than 2 cables from the rocks; native vessels enter the cove at H. W., and lie aground at low tide.

MOHILLA at one time was considered, of all these islands, the best for obtaining refreshments; but the preference, for many years, has been justly given to Johanna, on account of the anchorage being safer than at any of the others. Mohilla is the smallest of these islands, lying E.S.E. and W.N.W. 5 leagues, distant $8\frac{1}{2}$ leagues S. by E. from Comoro, and 7 leagues W. of Johanna. The N. point is in lat. $12^{\circ} 17' S.$, lon. $43^{\circ} 45' E.$, and the most elevated part is near the N.W. end; but it is not quite 2,000 ft. high. At the S. end of the island are several small isles, with a coral reef around them, behind which Van Keulen described good anchorage, with 8 or 9 fathoms least water, in crossing the coral reef to the E. of these isles, where the ground is

plainly seen, but no danger. The soundings within the reef are said to be from 45 to 30 fathoms, sandy bottom, where is the anchorage. Doany is also an anchoring-place near the shore, at the N.E. part of Mohilla, in 8 fathoms at 1 m. off shore, and refreshments may be obtained. Cattle are good and cheap, the island is fertile; coffee and spice trees grow luxuriantly in a garden belonging to the queen, who resides at Doany, in lat. $12^{\circ} 18' S.$, lon. $43^{\circ} 46' E.$ There is a small harbour for coasters within $\frac{1}{2}$ m. of the town; a plan of this is given on the Admiralty Charts of the Comoro Islands.

A black rock, in lat. $12^{\circ} 18' S.$, lon. $43^{\circ} 41' E.$, always above water, lies about 2 m. short of the N.W. point of the island, and about 2 m. from shore: in passing this about 2 m. distant, had no ground with 30 and 40 fathoms. A reef of rocks above water projects from the N.W. point of Mohilla about $\frac{1}{2}$ m., and at $1\frac{1}{2}$ m. there is no ground 30 fathoms. Having previously sent a boat to examine the shore between Black Rock and Doany, the ship *Suffolk*, in 1766, stood in, with boats ahead, sounding, and anchored at 6 p.m. in 24 fathoms, small stones, shells, and coral: then moored with the stream to the N., in 26 fathoms, off shore $\frac{1}{2}$ m., the N.W. point of Mohilla bore W.S.W., the E. extreme E. by S. $\frac{1}{2}$ S., and a small town S.S.W. The watering-place at this town was found to be about 200 yards from the beach, up an easy ascent, in a ravine about 12 ft. deep, formed by torrents from the hills. This was steep, which made it necessary to fill the casks with the engine: they were then rolled with great ease from the soft, sandy beach. The run of water is clear and constant from the mountains. A reef of rocks extends from the point on which the town is built, across the little bay where the watering-place is, to two rocks to the E., which are always above water; this prevents boats working the last quarter-ebb and the first quarter-flood, as the reef is dry at L. W. The coast between where the ship lay and Doany is very dangerous, having several reefs of rocks projecting far out into the sea, so that a ship cannot lie nearer than 2 m. from the land; there is a great surf on the shore, and boats cannot go in after ebb. The watering-place at Doany is a mile beyond the town, and not convenient, there being a chopping sea which prevented boats rowing. The coast appeared very rocky, about 4 m. farther along shore to S.S.E.; and, being open to the S.E., a heavy swell came in, and the great surf on shore would make it difficult to water there. Fruit was had in abundance where the *Suffolk* lay, but only twenty-seven bullocks could be procured, and many of them small.

The White Rock, in lat. $12^{\circ} 24' S.$, lon. $43^{\circ} 58' E.$, and nearly 4 m. to E. of the S. E. end of Mohilla, is about 100 ft. high, with flat top and steep sides. Other islets lie off the S. coast.

Numa-Choa Harbour, in lat. $12^{\circ} 25' S.$, lon. $43^{\circ} 47' E.$, is formed between coral reefs on the S. side of Mohilla, and inside of several islets, having deep water amongst them. The islet Choa-Moa, lying $\frac{1}{2}$ m. off this port to the S. by E., shelters it in a measure from S. winds; but in the N.E. monsoon it affords better shelter; the anchorage is in 8 to 10 fathoms, sand and mud. Choa-Moa is the E.-most of the 7 islands that lie off the S.W. coast of Mohilla.

The W. Islet, in lat. $12^{\circ} 28' S.$, lon., $43^{\circ} 43' E.$, lies about 2 m. off the S.W. end of Mohilla.

Tides. High water at 4 h. at F. and C. of moon; the tide rises 12 ft., and sets along shore, the flood to the W., but changes before the water has done rising, as does the stream to the E. before it has done falling; the tide-stream is doubtless affected by the almost constant current from Cape Ambre.

MAYOTTA, the E.-most of the Comoro Islands, bears from Johanna about S.E., the breadth of the channel between them being 9 leagues. On the S. part of Mayotta there is a sharp conical mountain, called Uchongui, 2,100 ft. above sea; and at about 5 m. to N.N.E. of that, Mavagani Peak stands up, 2,160 ft. To the N.E. of this mountain, and off the E. extreme of Mayotta, lies Pamanzai Island, joined by a causeway to Zaudzi Island on its W. side, where the French have a light and a government establishment; here they keep a good supply of coal for French men-of-war. Mayotta has about 8,000 inhabitants; several sugar estates are situated at the E. part. The island extends N. and S. $7\frac{1}{2}$ leagues, the S. extremity being in lat. $13^{\circ} 0' S.$, and the N.W. part in lat. $12^{\circ} 41' S.$; it is surrounded by a coral reef, to the distance of 3 to 8 m. in some places. There are several openings in the reef at the N. part of the island, in $12^{\circ} 34' S.$, leading to a place of anchorage.

Saddle Island, or Zambouru (the 1,000 ft. high peak at N.W. part), in lat. $12^{\circ} 38' S.$, lon. $45^{\circ} 7' E.$, is situated at the N.W. end of Mayotta, and N.W. $\frac{1}{2}$ W. 8 m. from it is a dangerous reef of $2\frac{1}{2}$ fathoms. Between Saddle Island and the reef to the E. by N. of it, is the channel which leads to an anchorage, having deep water on the E. side near the sunken reef; but towards Saddle Island there are only 7 to 9 fathoms, near a spit projecting to the N.E. and E. Within this Island the depths are from 16 to 30 fathoms in proceeding to the anchorage near the town, which is now in ruins, about $2\frac{1}{2}$ m. S.S.E. from the Island, and abreast a bluff headland with rocks overhanging the sea. To the S.W. of Saddle Island, reefs and breakers extend 5 to 7 m. from the shore; and

beyond them a fringing coral reef stretches to the S., and right round the S. end of Mayotta, being from 7 to 5 m. off shore, with deep water (but sunken dangers) between.

Zambouru Passage. Enter with Cape Duamuni on with the S.W. peak of Pamanzai Island, about S.E. $\frac{1}{2}$ S., until Zambouru Peak bears W.; then you must run a little to E., to get into the Narrows, where buoys are placed, going between which you leave the buoy on *Prevoyants Shoal* on your right hand. The reefs are generally distinguished by the colour of the water, and the vessel should be piloted from the mast-head. A sailing vessel could seldom enter this Passage from the N.; but for *departure*, the Zambouru Passage is good, and a pilot should be taken at Zaudzi.

Zaudzi Harbour. The most secure anchorage is on the E. side under Pamanzai Island, off Choa Village, in 9 to 11 fathoms, $\frac{1}{2}$ m. from the village; and inside coral reefs. **Bandeli Opening** on the reef, on the E. side, appears to be the best, and lies about 5 m. to S. of the S. point of Pamanzai Island, having 10 to 28 fathoms in the channel, which is $\frac{1}{2}$ m. in width. Some of the channels are buoyed, and pilots are in attendance. A white obelisk on Mavegani Mountain (best seen in forenoon) serves as a mark, leading to the Bandeli Passage when bearing N. 72° W. Care is requisite, when entering for the first time without a pilot. In the morning, with the sun behind you, the reefs show well from the foreyard. To the S. there are three more openings in the reefs, from 4 to 6 m. distant, the latter in lat. $12^{\circ} 59\frac{1}{4}'$ S.

The Bay of Boeni at the S.W. side of the island is a secure anchorage. Boeni Passage through the outer reef leads in on an E. course, with Boeni Point in line with the S. peak of Mavegani Hills; but should only be attempted in the afternoon, when the reefs can be seen from aloft; otherwise, the inner passage to Boeni should not be attempted without a pilot, as numerous detached reefs lie off Boeni Point.

The Great W. Passage (centre), in lat. $12^{\circ} 48'$ S., lon. $45^{\circ} 1'$ E., into Boeni Bay is wide and safe, and a ship has room to *work* in, but the afternoon should be chosen, when the sun is in the W. Enter on an E. by S. course, with Red Mount (a hill, with red patch near the sea) on with Combani Mountain (a sugar-loaf, on the near range). When the E. point of Boeni Peninsula comes on with Uchongui Peak about S.S.E., steer for them till within 2 m. of the E. point; then keep away S.E. for Caroni Island, but anchor to the E. of E. Point, if you have not a good chart or a pilot.

The Saziley Passages, on the S.E. side of the island, are not much frequented. The S. Saziley, in lat. $12^{\circ} 59\frac{1}{4}'$ S., lon. $45^{\circ} 18'$ E., is wide and good; the mark for entering is Bonni Island (at the S. extreme of Mayotta), bearing W. $\frac{1}{2}$ N., or a distant tuft of trees, bearing W. by N. $\frac{1}{2}$ N. over Dapani Point. These passages may be entered in the morning, when the sun is at your back, but nothing would justify a stranger in attempting them.

Currents. In the vicinity of Mayotta the current is very variable. This island appears to be to the S. of the general W. stream flowing from Cape Ambre past the Comoro Islands. Between Mayotta and Johanna, the current is generally to S.W., but at times sets to the S.E. with some strength: during calm and variable weather. H. M. S. *President* was set from the N.W. to the S.E. part of Mayotta round the E. side, in two days. About the S. end of Mayotta, an E. current is very common. Ships are frequently liable to calms and light winds near these islands, particularly at the changes of the monsoons, when the currents are also variable.

JOHANNA, or Anzuan, is more frequented by European ships than any other place of refreshment in the Mozambique Channel; it is higher than Mohilla or Mayotta, though not so much elevated as Comoro. The mountain called Johanna Peak, 5,100 ft. high, is rather of an oblong form, near the E. part of island, in lat. $12^{\circ} 15'$ S., lon. $44^{\circ} 27'$ E. The S. extremity of island is in lat. $12^{\circ} 22'$ S., lon. $44^{\circ} 30'$ E.; it is a bluff of considerable height, and a reef skirts it fully 1 m. off, or more. The island is of a triangular form, with rocky reefs extending from its extremities; and from the S.W. to the N.W. point the shore is bounded by a reef, to the distance of $2\frac{1}{2}$ m. from it in many places. Ships therefore should not in light winds come too near the S. shore of this island, in case of a calm ensuing, and the current or swell drifting them on the reef. The *Brilliant* drifted towards shore, and was wrecked on the reef, at the S.W. part; several other ships only by great exertion have been towed clear of it by their boats, when becalmed near the S.W. side of this island.

Pomony Harbour, in lat. $12^{\circ} 16\frac{1}{4}'$ S., lon. $44^{\circ} 25'$ E., on the S.W. side of Johanna Island, is a small place of shelter, between coral reefs, in which you get from 15 to 5 fathoms, but with only room for three or four small vessels. The E. I. C. steamer *Semiramis* was here beached for repairs. A coral shoal lies in mid-entrance; two white beacons (in a line) were erected to the W. of the village, to lead a vessel in between the central shoal and the E. reefs, on a N. by E. $\frac{1}{2}$ E. course, and a pole with basket marks the N. tip of the E. reefs, round which a vessel turns in to the E. A sugar factory with a white square chimney stands on the shore about $\frac{1}{2}$ m. to S.E. of the harbour's

mouth, and the best watering-place is said to be near it. To distinguish this port, there are two peaks (like dogs' ears) immediately over it. During the N.E. monsoon ships calling for water may conveniently anchor in 14 fathoms, with the factory chimney N.E. by E.

Supplies. Provisions and coals are kept at Pomony for H. M.'s ships on this station, and two coal-boats are kept. Cattle and fresh supplies are plentiful.

The Harbour. Owing to the small capacity of this port, care is requisite not to enter with *too much way on*, as you have to turn sharp round to the E. after passing the reef-beacon. Vessels should moor as most convenient. During the N.E. monsoon the harbour is quite smooth, but strong gusts come down from the hills at times; at all seasons of the year it is at L. W., like a dock. During the S.W. monsoon, it is only smooth at L. W.; for, towards H. W., a good swell rolls in and prevents dry landing; at that season it is well to have the best anchor close over to the weather side, that she may ride with a whole cable out. But it is remarked that the S.W. winds appear never to blow home at Pomony against the lofty wall of mountains at its back; in this it resembles Port Lutro (the ancient *Phanice*) on the S. shore of Crete Island (*see* page 21.)

Saddle Island, in lat. $12^{\circ} 10' S.$, lon. $44^{\circ} 15' E.$, and 400 ft. high, connected with the main island by a reef, lies off the N.W. point of Johanna. This Island should not be passed nearer than 3 m., as the foul rocky ground extends from it about 2 m. on the N., and $2\frac{1}{2}$ m. on the W. side, and is steep-to, having no soundings, with 20 fathoms close to its outer edge. If a ship happen to pass too near, and have soundings on the verge of the foul ground off Saddle Island, she ought to edge away to the N. immediately. When past Saddle Island, the W. boundary of the large bay on the N. side of Johanna, she should steer along to the anchorage, hauling up gradually for the shore, on account of the reef, which extends from Saddle Island about 4 m. along shore to the E., and the shoal water on it is generally visible. When thus far advanced, the sudden gusts, which often blow from the hills, make it prudent to keep in with the land in sailing to the anchoring-place, which is about 2 or 3 cables' length W. by S. of the town, abreast a range of cocoa-nut trees near the sea, called Brown's Gardens; and having a large black rock to the S.E., in from 8 to 23 fathoms. The rivulet where water is procured is at the W. extremity of those gardens.

Bay of Johanna. Care should be taken not to make too free with the shore, after luffing round Saddle Island. It may be approached very close in some parts, but $2\frac{1}{2}$ m. is sufficiently near to *venture*, for in several places coral rocks extend out 2 cables' length. This is the case to the W. of the Black Rock, also to the W. of the fort. Be on your guard, by having your ship under proper sail for working, as gusts of wind often blow from the land; and when you approach the Black Rock, luff in if you can, and get soundings, and be ready to tack if you cannot fetch into the anchorage. Keep the deep-sea lead going, when standing towards shore, with the hand-lead also ready. Have the boats ready to tow, in case it should fall calm, as they may often be found very useful. The most convenient berth and good anchorage is at some distance to S.W. of the Black Rock and off Brown's Gardens, in 15 to 10 fathoms, $\frac{1}{2}$ m. off shore, with a white beacon S.E., Black Rock about E. $\frac{1}{2}$ N., or the Mosque E. by N.; Johanna Peak will be a little to S. of the white beacon. During the S.W. monsoon, this anchorage is quite smooth and safe, but violent gusts blow off the land, and ships may *drag* off the bank of soundings and be blown out to sea. Between Brown's Gardens and the Mosque Town there is a reef of rocks projecting from the shore nearly $\frac{1}{2}$ m., dry at L. W. At the E. extremity of the bay, a reef of sand and coral lines the shore along the N.E. part of island, having deep water on its outer edge.

Tides. High water at $8\frac{1}{2}$ h. on F. and C. of moon; the rise $8\frac{1}{2}$ ft. perpendicular. Variation $10^{\circ} 50' W.$ in 1863.

Johanna Town, or Moosa-mudu, is on the N.W. side of the island, about 10 m. to E. of Saddle Island, and nearly 7 m. from the N.E. point. The town, governed by an independent Sultan, has a mosque, and an old hill-fort looks down upon it. The English Consulate stands on the beach about 300 yards to S.W. of the town. The water at Johanna is excellent, but wood is scarce. The bullocks are small, but the meat is good. Goats, kids, and poultry may also be procured at high prices. On the whole, this is a proper place for obtaining refreshments, or restoring to health a scorbutic crew, for the island abounds with cocoa-nuts, limes, oranges, plantains, and other tropical fruits; yams and sweet potatoes may also be procured. The Sultan levies 10 dollars upon each merchant-ship, as port-dues. As the wind blows from hills and valleys in variable gusts, it is prudent to bring a ship under proper sail on approaching Saddle Island, for hauling close to the wind, or for tacking, should that be requisite before she reach the anchorage. The natives are hospitable, but possess a considerable degree of low cunning, and some are thieves.

Winds and Weather. In Nov. the weather is precarious; heavy rains are then expected, with the changing of monsoon, which generally happens about mid-Nov.; the N.E. monsoon then commences, but does not blow hard till end of Dec. and all Jan. Then it is considered not

perfectly safe to remain in Johanna Road during these Northerly winds, at times liable to blow strong. The currents are variable about this island, particularly at change of the monsoons; but their general course is to the S.W. The N.E. monsoon reaches Johanna about a fortnight later than Zanzibar. Captain Nolloth experienced (in three consecutive years) the first decided *blow* about Christmas Day. Jan. is considered the worst month in the year for riding in Johanna Bay.

The N. and E. Coasts of Johanna. The N.E. point is in lat. $12^{\circ} 5' S.$, lon. $44^{\circ} 30' E.$; and off it, shoal water extends probably 1 m., but vessels should give it a berth of 2 m. at least. A reef lines the shore from this to the old town of Whany, and on to Johanna. The E. coast is high and rocky with few indentations; but being usually the weather side, vessels had better keep off it. **Demony**, in about lat. $12^{\circ} 14' S.$, is a small dhow harbour, but never visited by shipping.

Directions. During the S.W. monsoon, sailing vessels had better approach Johanna Town from the W., where a fresh breeze will often be found, when calms prevail on the E. side. During the N.E. monsoon on the contrary, it is best to approach from the E., on account of light winds and W. currents which sometimes sweep you away towards Mohilla.

DANGERS IN THE VICINITY OF THE COMORO ISLANDS.

Geyser Reef, or Firebrass Shoals, seen by these ships and the *Devonshire*, are in form of a rescent, concave to S.E. These dangers lie about 70 m. to E. by N. of Mayotta, or between lats. $12^{\circ} 16'$ and $12^{\circ} 27' S.$, and lons. $46^{\circ} 25'$ and $46^{\circ} 37' E.$; but a doubtful shoal, the *Bisson*, is said to lie 20 m. to the N. of Geyser Reef; and another, the *Borneo*, is marked on charts about 18 m. to the N.W., but it is thought that the *Borneo* whaler was wrecked in July, 1832, on the Geyser Reef. This was probably the shoal on which the *Shannon*, of Liverpool, was wrecked in Oct., 1842, in lat. $12^{\circ} 24' S.$, lon. $46^{\circ} 32' E.$ Thorough examination only can establish the existence of separate reefs, but navigators had better give a wide berth to these. The Geyser reefs lie about 60 m. to S.W. by W. of the Glorioso Islands. (See page 538.)

Zelee Bank, which lies to W. by S. of Geyser Reef, seems a well-defined shoal on the same plateau with the latter; it has 7, $5\frac{1}{2}$, and 9 fathoms, on an E. and W. line of about 3 or 4 leagues in length; the shoalest water ($5\frac{1}{2}$ fathoms) being in lat. $12^{\circ} 31' S.$, lon. $46^{\circ} 17' E.$

Ships passing to the E. of Mayotta ought to proceed with much circumspection, as there may possibly exist other banks or dangers, not yet discovered.

Castor Bank and Leven Bank are described at page 553, as shoals off Nos Beh Island.

St. Lazarus Bank, centre in lat. $12^{\circ} 10' S.$, situated about 100 m. to the W. of Comoro Mountain, and 17 to 34 leagues to the E. of the Querimba Islands, is very little known, although several ships have sounded on it. The *Dorset* had soundings of 12 to 18 fathoms on it, in lat. $11^{\circ} 56' S.$; the *Edgecote* had 10 and 12 fathoms on it in lat. $12^{\circ} 4' S.$; and the *Raymond*, in lat. $12^{\circ} 13' S.$ The soundings obtained on it by these ships seem to have been from 9 to 50 fathoms; but the extent of this bank, its real distance from the adjacent coast, and from Comoro, and whether or not any part of it is dangerous, remain imperfectly ascertained. The Portuguese describe it to be dangerous. The *Kauntz* is said to have seen breakers distant about 3 leagues, when the land was visible to the W. about 11 leagues off; however many of H. M. ships have sounded in vain the given position, in lat. $11^{\circ} 3' S.$, and lon. $42^{\circ} 25' E.$; but although this does not agree with the latitude assigned to St. Lazarus Bank, they are considered by some as the same shoal. The ship *Reliance* grounded on the shoal in 1833, and her commander, Captain Cockle, placed it in lat. $12^{\circ} 23' S.$, lon. $41^{\circ} 20' E.$ Its extent is said to be 27 m. from N. to S., by 52 m. from E. to W. (See also Querimba Islands, at page 95.)

Dangers. The *Charles et George* reported 3 fathoms in lat. $12^{\circ} 10' S.$, lon. $41^{\circ} 50' E.$; and a $3\frac{1}{2}$ fathoms shoal at 4 leagues to W.N.W. of that. H. M. S. *Cyclops* anchored in 10 fathoms, hard sand, in lat. $12^{\circ} 3' S.$, lon. $41^{\circ} 25' E.$; and had 8 fathoms a little to the S. of that; whilst one ship had 5 fathoms at 2 m. to the E. of that position. H. M. S. *Frolic* had 5 fathoms in lat. $12^{\circ} 10' S.$, lon. $41^{\circ} 23' E.$

H. M. S. *Gorgon* seems to have found all deep water to the E. of the above shoals, but there appears a detached circular bank, of some 5 or 6 leagues diameter, on which soundings of 7, 8, 9, and 12 fathoms have been found, and the centre of this bank is in lat. $12^{\circ} 2' S.$, lon. $42^{\circ} 10' E.$

The Vailheu Shoal is reported as lying 3 leagues to the W. of Comoro S.W. Point, and the ship *Devonshire* is said to have seen a long line of breakers at 12 m. farther W. than the Vailheu; Portuguese navigators say there are only 4 fathoms on the N.W. part at half-flood.

Some of these reported shoals may have been only current rippings, as a W. current runs almost perpetually here. (See also Vailheu Shoal in description of Comoro, page 555.)

WINDS AND CURRENTS IN MOZAMBIQUE CHANNEL.

The S.W. Monsoon, the fair season in Mozambique Channel, begins in April, and continues till Nov.; the N.E. monsoon then commences, and prevails until April. We call it the S.W. monsoon for convenience, as *that* monsoon then prevails in India; but, as might be expected, the winds are different at different portions of coast-line. During the S.W. monsoon, the winds vary on opposite coasts from S.W. to S.E. and E.S.E.: particularly near the S. end of Madagascar they blow often from S.E. and E., brisk and moderate breezes; close to African coast, land-breezes are frequent. In mid-channel they are more steady, generally blowing right through, when the distance is equal from either shore. But there are exceptions to this general observation, for in the S. part of channel, light variable winds and the W. currents have sometimes retarded ships bound to India by this channel. From lat. 24° or 25° S. to 15° or 16° S., light variable winds from E. and N.E., with W. currents, have sometimes been experienced during S.W. monsoon; this happened to the *Sir Edward Hughes*, in July, 1802, although at such times Southerly and S.E. winds may be generally expected. In Mozambique Channel, squalls from W. to N.N.W. may at times happen during S.W. monsoon, but never continue long.

Some remarks about the winds, near Nos Beh Island, will be found at top of page 552.

The N.E. Monsoon commences early in Nov. at the N. part of Mozambique Channel, but toward St. Augustine Bay not till the end of this month, and seldom extends farther S., the prevailing winds between Cape Corrientes and the S.W. part of Madagascar being Southerly, varying from S.E. to S.W. during both monsoons. A few remarks as to *cyclones* at Zanzibar and Mozambique will be found at page 116; and Piddington's "Sailor's Horn-Book" mentions two cyclones as having occurred in Jan., between Bassas da India and Mozambique. It is chiefly during N.E. monsoons that storms arise, when the S.E. and S.W. winds, which prevail without, are blowing strong; these winds blow into the channel, and are resisted by N.E. and N.W. winds, which produce a high turbulent sea, and sometimes whirlwinds, by their opposing force. At such times the sky is overclouded and the rain heavy.

Currents in Mozambique Channel, during the N.E. monsoon, generally set to the S. along African coast, and also in the offing from 18 to 28 m. daily; but on the coast of Madagascar they run to the N. On the African side they set to S., for most of the year, though liable to change in both monsoons, when the weather is precarious, and set to the N. for a short time. On the W. coast of Madagascar, the current at times sets to the N. during the S.W. monsoon; and on the African coast, generally to the S. It is often changeable about mid-channel. Among the Comoro Islands, or between Cape Ambre and Cape Delgado, it sets Westerly all the year round; but Mayotta Island appears to be to the S. of that general W. stream, and here variable currents are found. At the Glorioso Islands, the current always sets strongly to the W.; but near the Geyser Reef, a counter-current to N.E. sometimes prevails.

During the N.E. monsoon, the S.W. current of the African coast, from below Socotra, meets with the Zanzibar almost constant N. current, somewhere between Melinda and the Juba Islands; this meeting produces an off-shore set to E. by S., which chimes in with the E. by S. set at that season, extending from the Seychelles to the Chagos, in the belt of N.W. winds, sometimes called the Line Westerly Monsoon, or better still, as named by Captain Forrest in 1782, the Middle Monsoon. For further information, see the current charts and remarks thereon.

CHAPTER XVIII.

CHAGOS, MALDIVH, AND LAKADIVH GROUPS.

DIEGO GARCIA—EGMONT ISLANDS—PEROS BANHOS—SPEAKER BANK—ADDU ATOLL—PHUA MOLUK—
EQUATORIAL CHANNEL—SUADIVA ATOLL—ONE-AND-HALF DEGREE CHANNEL—ADU MATI ATOLL
—VAIMANDU CHANNEL—COLOMANDU ATOLL—MALI ATOLL—CARDIVA CHANNEL—THE NORTHERN
ATOLLS—HEAWANDU PHOLO ATOLL—EIGHT DEGREES CHANNEL—MINIKOY—NINE DEGREES
CHANNEL—LAKADIVH GROUP—BYRAMGORE AND CHERBANIANI REEFS—PADUA BANKS.

(VARIATION AT CHAGOS, 2° W.; AT LAKADIVHS, No VARIATION.)

The Chagos Group came into British possession in 1814, along with Mauritius and other islands, at the close of the French war. These islands, farmed by Frenchmen and subordinate to Mauritius, are increasing in importance, and also in population, which now amounts to nearly 600 souls. Pigs and poultry are plentiful; and fresh water is got by digging about 1 fathom deep. Cocoa-nut palms are most abundant, and the oil and coir fibre are principal articles of commerce. The rapid development of steamer-traffic, between the Red Sea and the Asiatic Archipelago, calls for a coaling-station between Java and Aden; Diego Garcia or Peros Banhos are very suitable places, and a good light-house would be a boon to navigators.

The Chagos Islands and Banks were minutely surveyed by Captain Moresby, of the Indian Navy, in 1837, in the surveying vessels *Benares* and *Royal Tiger*. They extend from the S. part of Centurion Bank, in lat. 7° 39' S., to the N. end of Speaker's Bank, in lat. 4° 44' S.; and between lon. 70° 55' and 72° 50' E.

The Great Chagos Bank is dangerous on the outer edge for ships, having in some parts only 4 fathoms, and seldom more than 6 or 7. When over the edge, the soundings suddenly deepen to 30 and 45 fathoms, with here and there patches of 8 and 6 fathoms. Navigators are advised not to pass over this bank, except in necessity, and then only in the daytime. Should a ship be in want of stock, water, and wood, they can easily be procured, by visiting either Peros Banhos or Diego Garcia, both of which lie without the bank, and afford every facility for vessels touching there. Pigs and poultry may be obtained in abundance, either from the overseers or the negro apprentices belonging to the establishments.

DIEGO GARCIA extends from lat. 7° 13½' to 7° 26½' S., and its centre is in lon. 72° 30' E.; its length from N. to S. being 14 m., and the general breadth from 3 to 4 m., crescent-shaped, convex to the E. This remarkable island forms a steep coral wall to a lagoon or natural harbour: no part of the wall is above ¼ m. broad, and on the E. side it is in many places of much less breadth. This island is low, generally 8 or 10 ft. above the sea at high tides, and covered with tall cocoa trees, which make it visible 5 or 6 leagues. A steep coral reef fronts the sea all round, on which it breaks very high, and renders landing on the exterior impracticable. Inundations of the sea appear to have pervaded the wall in some places, and imparted their waters to those in the harbour. The external reef is steep to in most places, having no anchorage for a ship except in the harbour entrance at the N.W. end. Between the E. and W. points of the entrance are three islands, called East, Middle, and West. West Point and Island are joined by a reef dry at L. W. Middle and East Islands are situated on the edge of an extensive coral bank, which projects from them about 2 m. to the S. into the harbour: several parts of it are dry at L. W., with dangerous patches of 1½ and 2 fathoms coral in other places. The same coral bank extends to the East Point, rendering the passage between it and these islands unsafe, except for very small vessels; the ship *Hampshire*, of Bombay, was wrecked in attempting to enter.

The only safe channel into the harbour is 1 m. wide between West Island and Middle Island; a sand-bank projects from the latter above ¼ m. to the S.W., but West Island is safe to approach on the N.W. and N. sides. There are no soundings until a ship is close to the entrance; the water then shoals suddenly, from 100 fathoms, no ground, to 20, 10, and 7 fathoms. The French used to keep a small settlement on this island, consisting of slaves and a few Europeans, who prepared

cocoa-nut oil and salt fish for small vessels which came annually from Mauritius. A variety of fish abound in the harbour, and excellent green turtle visit the outside shores of the island: the land-crabs, which feed on the cocoa-nuts as they fall from the trees, are also wholesome food; and good fresh water may be had in almost every part, by digging 8 or 10 ft. deep.

Directions. The S.E. winds prevail here from April to Nov., but are strongest in June, July, August, and part of Sept., during which time the current generally sets between W. and N.W., from 12 to 20 m. daily. In March and April the winds are often very variable and light; Oct. and Nov. are also changeable months, but more unsettled and more squally than the former. In Dec. and Jan., the N.W. winds prevail almost constantly, producing a current to the S.E. A ship proceeding by the Southern passage from the Bay of Bengal to Bombay, and desirous of getting a sight of Diego Garcia, should keep in about lat. $7^{\circ} 30'$ to $7^{\circ} 35'$ S., when approaching its meridian, and pass to the S. of the island if the wind is favourable. If she intend to stop for a supply of water,* or other refreshments requisite for a scorbutic crew, she ought to steer for the N.E. part of the island, keeping in the parallel of $7^{\circ} 18'$ S. When the S.E. winds blow strong, with hard squalls, much rain, and cloudy weather, in July, Aug., and part of Sept., she must guard against the N.W. currents, as she might be carried to the N. of the island, if observations were not obtained. The shore being free from projecting shoals, she may, in the day, run for it without danger, if the weather be not so thick as to prevent land from being seen at the distance of 2 or 3 m. The island being low, and sometimes enveloped by a cloud in the night, (as in the case of the *Atlas*, which ship was wrecked on the S.E. side of the island) great caution is requisite in running for it at such times; nor should it be approached in a dark night.

Running for it in a clear night, or in the day with thick weather, when near its position, a ship should be kept under such sail as she can bear on a wind; and if the island is seen, her head ought immediately to be laid to the N.E. off shore, if it is night; and it may be prudent to ply to windward till morning, to prevent being carried to leeward by the current. In the day, she should steer along by the N.E. point boldly, passing close on the N. side of East and Middle Islands, and round the spit that extends near a mile to the W. of the latter, as close as consistent with safety, to enable her to fetch higher up the harbour. In clear weather, the dangers are always visible from the mast-head; an officer stationed there to look out is the safest guide. Care must be taken, in working into the lagoon, with a S.E. wind, not to stand farther to the W. than to bring West Island bearing N., that the shoals in the bight to the S. of this island may be avoided; nor too much to the E., that the bank and shoals to the S. of Middle Island may also be avoided. Entering the channel during S.E. winds, it is proper to keep near to the sand on the W. side of Middle Island, which has $5\frac{1}{2}$ and 6 fathoms close-to; a ship on the port-tack may thus, without tacking, fetch into good anchoring-ground, with West Island bearing N. $\frac{1}{2}$ W.; but attention is requisite not to stand to the W. of the meridian of this island, on account of the shoal in the bight. This part of the harbour is the safest when N.-Westers blow, and equally secure with any other part in the S.-Easters. Its vicinity to the sea, and the facility with which ships may be brought in or carried out, make it preferable to any other part of this capacious harbour; and, if necessary, ships may be warped between the shoal patches, within 500 yards of the shore.

The anchorage at this part is generally sandy clay, with bits of coral in some places, and there is good water found in digging on the N.W. part of the island, abreast the anchorage. In the channels between the coral banks, in the harbour of Diego Garcia, the bottom is generally fine, white sand, mixed in many places with coral. About half-way up the harbour it is contracted by a large flat projecting from the W. shore, and several coral patches in the channel make it in this part intricate for large ships. To the S. of this intricate channel, on the E. side of the harbour, there is good anchorage beyond the point that projects from the E. shore. In the upper part of the harbour, the depths are from 5 to 10 and 11 fathoms, and between the entrance and middle part of it, from 7 or 8 to 16 or 18 fathoms, except near the shores, or on the coral patches or flats; the depths on these are from 1 to 3 fathoms. If a ship be obliged to anchor at the entrance of the harbour, on the outside, it should be with the channel open, for the wind has been known at times, in the S.E. monsoon, to veer to the N.W., and blow from this quarter a short time in squalls.

Tides. The tides rise and fall from 5 to $6\frac{1}{2}$ ft., running into the harbour S.S.E., and out of it N.N.W. It is H. W. at 1 h. 30 m. on F. and C. Spring-tides in the entrance of the channel run about 2 knots, and unless a vessel has a fair wind or a good slant, she would find it impossible to work into the anchorage against the tide. During the S.E. trade, which blows directly out of the harbour, it is advisable to make the island from the E., and so time her arrival off the entrance of the channel as to have the tide in her favour to enter, when she can easily work in.

* We hope to see the day when a coaling station, with a light-house, may be established at one of these islands, and at Minikoy and Socotra. See remarks on "Steamer Passages" in Chapter XII., page 328.

The **Entrance Channel** is a mile broad; do not approach too near the reef which extends W. from Middle Island; this reef is deceptive, having shoal patches of coral off its W. extreme, not easily discernible. The West Island is steep, and can be safely approached; when inside the channel, the only care required is to have a look-out at the mast-head, to avoid the coral patches, a few of which are in the centre of the bay, having 3 and $2\frac{1}{2}$ fathoms on them. Care must be taken not to stand too close over to the islands bounding the E. side of the channel, as there are several coral knolls off this part. A coral bank, dry at L. W., surrounds the inner part of the island, extending from 100 to 200 yards off shore—this is easily seen. The best anchorage for a ship during the S.E. trade is at Minni Minny Establishment, which bears from the centre of Middle Island S.S.E. $\frac{1}{2}$ E., 7 m. At this place, a ship anchors with the houses bearing S.E. or E.S.E., distant $\frac{1}{2}$ m., and $\frac{1}{2}$ m. off the shore-reef, in 10 fathoms, sand, the water perfectly smooth, and boats able to land on the beach at L. W. The fresh water, in wells, is close to the beach, and very excellent; fire-wood, also, may be readily cut. In the N.W. monsoon, from Dec. to April (the rainy season), this anchorage has a lee-shore, and a chopping sea. Vessels ought then to anchor on the W. side of the bay, under lee of the land near Point Marianne Establishment, which bears from the centre of Middle Island S. by E. $5\frac{1}{2}$ m. A shoal bank of sand and coral extends off Point Marianne $\frac{1}{2}$ m. into the bay, close to the edge of which a ship may anchor in 8 to 10 fathoms, soft sand. Point Marianne and the Establishment are known by some high trees of the fir species. (Variation of compass, 2° W.)

From Oct. to Feb., when W. and N. winds may be generally expected, a ship from Bombay, intending to stop at this island, should pass to W. of the Maldivas and Chagos Banks, and steer to the E. for it, keeping in its parallel, or that of the Eagle and Egmont Islands.

The GREAT CHAGOS BANK. The S.E. point is 32 m. to N. of Diego Garcia, and in lat. $6^{\circ} 42'$ S., lon. $72^{\circ} 29'$ E.; the E. boundary is in lat. $6^{\circ} 5'$ S., lon. $72^{\circ} 50'$ E. On the N. part lies **Nelson Island**, in lat. $5^{\circ} 41'$ S., and lon. $72^{\circ} 22'$ E. The N.W. point lies 45 m. W. $\frac{1}{2}$ S. from Nelson Island, and 25 m. to N.E. $\frac{1}{2}$ N. from Eagle Island. Danger Island, 12 m. to S.S.W. of the latter, marks the W. point of this Great Chagos Bank. There is a passage, 5 m. wide, between it and Egmont Islands. The soundings on the edge of this bank are from 4 to 10 fathoms, sand and coral rock: the shoal water on its edges is not very broad. The surveyors consider it very dangerous; for, though they never found less water than 4 and $4\frac{1}{2}$ fathoms, a ship would do wrong to proceed over it without a good look-out, or adopting some of the channels which lead in. On some parts of the verge of this bank not less than 7 and 8 fathoms are to be found: when inside the bank, the soundings deepen to 40 and 45 fathoms, soft clay. Several coral patches, with 7 and 8 fathoms on them, will be found in the interior; these are capital spots to anchor on. Sharks and some red rock fish are in abundance.

Pitt Bank is 20 m. to S.W. of the Great Bank; between them there is a clear channel in which the Egmont or Six Islands are situated. This bank is of an oblong shape, placed N.W. and S.E., near 30 m. long by 17 m. broad: its S. extreme is 60 m. W. of Diego Garcia. Its N. extreme bears S.W. 12 m. from the Six Islands; the trees on which are just discernible from the poop of a ship, on the N. end of the bank. This bank is dangerous on the N. and E. sides; where on some parts we found 6 and 4 fathoms—there may be less; on the centre of the bank the soundings are deeper, from 17 to 20 and 24 fathoms, soft bottom; like the Great Chagos Bank, it is steep all round. Pitt Bank ought to be avoided by navigators, more especially at night; yet in the day-time it may be passed over, if a good look-out is kept and the shoal-patches avoided. There is good anchorage on the bank.

Ganges Bank, named after the ship that discovered it, in March, 1817, is a small bank to the S.W. of Pitt Bank 18 m.; its centre is in lat. $7^{\circ} 22'$ S., and lon. $71^{\circ} 8\frac{1}{2}'$ E.; it is from 3 to 4 m. in extent; least water 8 fathoms. There are no soundings near it at 100 fathoms.

Centurion, or Rainier Bank is to the S.W. of the Ganges 16 m.; between them are no soundings; the least water on this bank is 6 fathoms on the S.E. edge, where heavy rollers were observed breaking at times, and boats were nearly swamped. It is from 4 to 5 m. in extent, lying N.W. and S.E.; and in lat. $7^{\circ} 37'$ S., and lon. $70^{\circ} 57'$ E. There are no soundings close to the bank.

Owen Bank, situated 150 m. to W. by N. of Diego Garcia, and 70 m. to N.W. of Centurion Bank, was discovered in Nov., 1811, by Admiral Owen, when conveying some transports from Batavia towards Bombay. He saw bottom, and carried 19 and 20 fathoms for half an hour on the bank, although the other ships had no soundings; this was in lat. $6^{\circ} 46\frac{1}{2}'$ S., lon. $70^{\circ} 20'$ E. by chronometer, from Diego Garcia in three days. The bank may be of greater extent, but has not since been examined.

EGMONT, or SIX ISLANDS, bear from Diego Garcia about W.N.W., distant 69 m. The

S.E. island, one of the largest of the group, on which is built an establishment for cocoa-nut oil, is in lat. $6^{\circ} 40'$ S., and lon. $71^{\circ} 28'$ E. Five other islands lie on the edge of this coral reef, extending to the W.N.W. 5 m.; the N. islands have conspicuous trees on them; there are no channels between the islands, nor soundings close to the reef, which is of an oval shape, having a lagoon in its centre, and depth of water in it from 8 to 12 fathoms: it is full of coral knolls. There is a wide channel leading into this lagoon on the N. side of the circle; but only small vessels can enter, as 2 fathoms is the greatest depth of water on the edge of the reef. No coral bank extends off the S.W., but the reef is steep close to the breakers. The current and tides sometimes wash the loose sand off the reef to leeward, and discolour the blue water for $\frac{1}{2}$ m., which may be taken for shoal water fit for anchorage. These Islands produce 6,000 gallons of oil yearly; pigs and poultry in abundance; also pigeons, and the fat-tail land-crabs, which are numerous. Fresh water is also easily procured: but, as there is no anchorage, a vessel in want of supplies should go to Diego Garcia, Peros Banhos, or Eagle Island.

DANGER ISLAND, in lat. $6^{\circ} 23'$ S., lon. $71^{\circ} 18\frac{1}{2}'$ E., is 15 m. to N.N.W. of the Six Islands, and on the W. edge of the Great Chagos Bank. It is nearly $1\frac{1}{2}$ m. in extent, low, and covered with trees: a violent surf breaks on it. It is said to be full of wild poultry, and belongs to the proprietor of Eagle Island. A dangerous reef extends 3 m. off the S. point of this Island, on which the sea breaks at times.

Eagle Island, to the N.N.E. of Danger Island 11 m., is $2\frac{1}{2}$ m. long, N.E. and S.W., and lies also on the W. edge of the Great Chagos Bank. It is covered with cocoa trees, and some high jungle trees on its S.W. point; off which a breaking reef extends $\frac{1}{2}$ m. To the S.W. of Eagle Island, distant 2 m., lies a low, woody islet, between which and Eagle Island there is a good channel, and anchorage in 5 or 8 fathoms, water, sandy and coral bottom; but the bank is only 1 m. broad. There are no soundings or anchorage to the N.W. of Eagle Island. The village lies at the W. side near the centre, and is in lat. $6^{\circ} 11'$ S., and lon. $71^{\circ} 23'$ E. The landing-place is opposite the village; it is bad during N.W. winds, from Dec. to May, but good during the S.E. trade: landing is never attempted on any other part of the Island, it being dangerous. A ship requiring supplies of wood, water, and poultry, may easily obtain them here, and may anchor as above between the two islands. The proprietor obtains yearly about 6,000 gallons of cocoa-nut oil, a small quantity of cotton, soap, and tortoise-shell. Salt fish is also exported.

The Three Brothers, in the N.W. bight of the Chagos Bank, and 11 m. to the E. of Eagle Island, are small, woody islands, covered with cocoa trees. They are not inhabited, yet belong to the proprietor of Eagle Island; the centre one is in lat. $6^{\circ} 8\frac{1}{2}'$ S., and lon. $71^{\circ} 36'$ E.; from this the S. Brother, the largest, lies 1 m. to the S.E.; and the N. Brother, the smallest, 2 m. to the N.W. They are difficult to land upon, on account of the high surf. To the E. of the Brothers there are various depths, from 12 to 40 fathoms, shoaler near the N. Brother. Off the S. Brother a reef extends to S.E., and a bank with 4 fathoms for 4 m. to E. Between the S. and Middle Brother there is a channel, having in the centre a rocky islet, on each side of which the soundings are from 12 to 20 fathoms. Between the N. and Middle Brother is a good channel, from 35 to 25 fathoms. There is deep water along the S.W. side of the Brothers, with 40 and 50 fathoms, but there are some dangerous shoal spots, from 3 to 4 m. to S.W. of these islands, and the shoal margin of the Chagos Bank runs up 18 m. to N. of the N. Brother.

NELSON ISLAND, in lat. $5^{\circ} 40\frac{1}{2}'$ S., and lon. $72^{\circ} 22'$ E., on the N. verge of the Great Chagos Bank, is a low rocky island, about 12 ft. above sea, composed of rocky cliffs of sandstone. The E. and W. ends are covered with long grass and a few bushes; it is nearly divided by a dry sand-bank, and, seen from a little distance, looks like two islands: from E. and W., it is $1\frac{1}{2}$ m. in length by 400 or 500 yards broad. There are no soundings close off its N. side. On the E. and W. are several shoal spots of 4 fathoms, yet there is a good deep channel of 25 fathoms close to the E. side of this Island, leading on to the bank, where there are 20 to 17 fathoms, sand and coral. This Island bears from the Salomon Group about S.S.E. 10 m.

Victory Bank, in extent from 3 to 4 m., has from 3 to 4 fathoms, water, perhaps less, and therefore it is a dangerous coral bank. It was discovered by Captain Biden, in the *Victory*, in 1835, lies S. 11 m., and is in lat. $5^{\circ} 33'$ S., and lon. $72^{\circ} 16'$ E. There are no soundings close off this bank, Nelson Island bears from it S.E. by S. 9 m.

PEROS BANHOS, the largest group of the Chagos Archipelago, and, excepting Diego Garcia, the most valuable in the production of cocoa-nut oil—about 34,000 gallons yearly,—is the property of a gentleman at Mauritius, whose overseer and about ninety negro apprentices, manufacture the oil. This group was discovered by the French in 1744; their situation is between lat. $5^{\circ} 13\frac{1}{2}'$ and $5^{\circ} 27'$ S., and lon. $71^{\circ} 47'$ and $72^{\circ} 1'$ E. It forms nearly a square, not quite 15 m. across, and contains twenty-seven small islands, low, and covered with cocoa trees; they lie nearly all on

the N. and W. sides, two only being on the E., with four on the S. side, two of which are barren rocks. Between all the N. islands there are good channels leading in, having 8 and 10 fathoms, water. The N.W. islands are connected by a barrier reef, which continues to the S. along the W. side, as far as the middle of the group, where a good channel, $\frac{3}{4}$ m. wide leads in, having 10 and 15 fathoms, water. **This gateway into the lagoon** is in lat. $5^{\circ} 22' S.$, and lon. $71^{\circ} 47' E.$ The barrier again commences on the S. side of this channel, and connects the islands on the W. and S. sides; it breaks off again into several channels on the centre of the S. side, close to two small rocky islands, with bushes on them,—Ile Vache Marine, and Coin du Mire. Here the barrier is lost altogether above water; it can be traced under water, having 3, 5, and 7 fathoms on it. A vessel of 300 or 400 tons may pass over it, but the deeper parts ought to be chosen.

A ship making Peros Banhos from the S., or during the S.E. trade-winds, where a heavy swell rolls into the Atoll, would do well to enter by the S. channels, and anchor under the lee of Ile du Coin, the S.W. island and reef, where there is an establishment of negro apprentices.

ILE DU COIN is about 2 m. long; and two smaller islets stand on its barrier reef. The E. islet, called Ile Foquet, covered with low trees, is at the end of the barrier reef, round which a vessel may steer to enter the group; the channel here between Ile Foquet and Ile Vache Marine being 2 m. wide, with 7, 8, and 10 fathoms, water, in it. From the channel, a W. course $3\frac{1}{4}$ m., leads to the anchorage off Ile du Coin, in 13 to 15 fathoms, water, with the houses bearing S.W., distant about 1 m.: wood, water, poultry, and some fruits and vegetables, may be obtained from the negroes. This is a good anchoring-place during the N.W. winds, or rainy season; but as the N. islands then afford better shelter for a vessel getting her supplies, Captain Moresby recommends Diamond Island from Dec. to May.

Diamond Island is the N.W. island of the group, about 2 m. long, thickly covered with cocoa trees, and contains the principal establishment, which is in lat. $5^{\circ} 15' S.$, lon. $71^{\circ} 48' E.$, and due N. 11 m. from Ile du Coin. A vessel may have the use of flat-bottomed boats to bring her water casks off. Plenty of poultry, fruit, vegetables, and pigs. The anchorage has 13 to 17 fathoms at $\frac{1}{4}$ m. to S.E. of the houses. A coral reef extends between 200 and 300 yards from the shore, which is dry at L. W., and is steep close to its edge. A ship departing from this anchorage to the N., may either proceed through any of the N. channels between the islands, or, if the wind is far to the N., can go through the E. channel.

Petite Coquillage and Grand Coquillage are two moderate sized islands, covered with cocoa trees; the latter stands at the S.E. extreme of Peros Banhos group. But the **E. gateway** into the interior is on the N. side of Petite Coquillage, in lat. $5^{\circ} 20' S.$, and lon. $72^{\circ} 0' E.$ This channel has 14 and 15 fathoms, but is only 3 cables broad; for the N.E. barrier reef, which is 6 m. long, begins at $\frac{1}{4}$ m. from Petite Coquillage and extends up due N. to Isle Yayé, the N.E. island of the group; between the two Coquillage islands there are also 4 and 5 fathoms.

Isle Yayé is covered with high cocoa trees, and has a broad and safe channel between it and Isle Manoel, with 10 to 14 fathoms in it, and a breadth of nearly a mile. Manoel bears W.S.W. $2\frac{1}{4}$ m. from the N. point of Isle Yayé.

Directions. A ship making Peros Banhos from the N.W. during N.W. winds, may either enter by the W. channel, called *Passe de l'Isle Poule*, in the centre of the W. side, or by Moresby Channel, which is the first channel on the N. side to E. of Diamond Island. **Moresby Channel** is $\frac{3}{4}$ m. wide, and has 7 and 8 fathoms, water; take care not to approach too near the spit of sand and coral reef extending off the E. end of Diamond Island $1\frac{1}{4}$ m., which bounds the W. side of the channel. Moresby Island, which is bold and safe to approach, marks the E. side of the channel of that name. The soundings increase to 20 and 30 fathoms, soft bottom, when a vessel has entered the group. Coral knolls are numerous in the centre, and easily seen from the mast-head; though with 2, 3, and 4 fathoms, water, over them; and their sides are precipitous. Close outside the barrier reef we found no bottom at 200 fathoms.

Benares Reef is a most dangerous coral shoal, having only $1\frac{1}{2}$ to 2 fathoms on it, and lies $4\frac{1}{4}$ m. to W. of Diamond Isle. The sea seldom breaks on it; it is $1\frac{1}{4}$ m. long N.W. by W. and S.E. by E., and ought to be avoided by ships making Peros Banhos from the N.W. There are no soundings near it, nor between the islands and it.

Tides. It is H. W. on F. and C. at Peros Banhos at 1 h. 30 m. p.m., rise and fall from 5 to 6 ft.; the ebb-tide sets to the W., flood to the E.; the ebb runs out of all the N. channels.

SALOMON ISLANDS seen from the French ship *Salomon*, Captain Bourde, in 1766, are on an oblong lagoon reef, 11 m. in circumference; there are eleven islands, but only one opening on the N.W. side. **Isle Boddam** is the S.W. and principal island, in lat. $5^{\circ} 21\frac{1}{2}' S.$, lon. $72^{\circ} 15' E.$, and 14 m. to E. of Peros Banhos.

Ile de Passe is the N.E. island, in lat. $5^{\circ} 18' S.$, and lon. $72^{\circ} 17' E.$, and the passage into

the lagoon harbour is on its W. side. This passage is nearly blocked up by a shoal patch in the middle, which has only $1\frac{1}{2}$ and 2 fathoms. On the N.E. side of this patch the channel is deepest, having 3 fathoms, and only 2 on the S.W. side. These islands appear much older than any visited; the soil is tolerable, and much deeper than at Diego Garcia or Peros Banhos; consequently, the trees make deeper root, and grow to a greater size. One sort called *Bois Mapan*, peculiar to these islands, apparently very good timber, grows to the height of 130 ft.; many are very straight, some 4 ft. in diameter, and 40 ft. from the ground to the branches. The young timber is white, but old decayed trees are of a deep chocolate colour, and the timber perfectly sound. The harbour is very secure, but the bar at the entrance makes it unfit for ships during the N.W. monsoon, Dec. to March. There are a number of shoals within, which, from the clearness of the water, may be easily avoided by keeping a good mast-head look-out. These Islands abound in cocoa-nuts and timber; tortoise-shells may sometimes be procured. The tide rises 6 ft., and it is H. W. at 1 h. on F. and C. of moon.

Blenheim Reef is a large lagoon, 6 m. long N. and S., by 2 m. broad: on the S. end there is an opening to the lagoon and anchorage off it in 6 or 7 fathoms; all other parts of the reef are steep, and it has no soundings near it. The rocks are generally covered at H. W., excepting some large blocks of coral and sand-stone on its E. side. The centre is in lat. $5^{\circ} 12\frac{1}{2}'$ S., lon. $72^{\circ} 30'$ E. It is S.E. of Speaker Bank, distant 10 m.; and bears about E.N.E. 12 m. from the Salomon Group. The vicinity of these dangers has been well surveyed. Between the Blenheim and Speaker there are no soundings.

SPEAKER BANK, named from the ship *Speaker*, Captain James Dewar, extends from lat. $4^{\circ} 44'$ to $5^{\circ} 6'$ S., and between the lon. of $72^{\circ} 17'$ and $72^{\circ} 30'$ E. It is nearly oval, lying N.N.E. and S.S.W. 24 m., having a slight indentation on its S.E. side, like all the other banks of the Chagos. Its edges are the shoalest part; there the least water is 6 and 7 fathoms, except on the S. part, where we found only 4 fathoms; no doubt the sea breaks here when the long ocean swell comes up with the S.E. trade. A ship ought to keep off this part, which lies 13 m. to N. of Salomon Islands. The water deepens on the centre of the bank to 15 and 22 fathoms, soft sand, and some spots of coral rock of 6 and 10 fathoms; the whole bank is sand and small coral. No soundings can be obtained close outside the Bank.

The **CURRENTS** about the Chagos are generally with the wind. Four months, from mid-Dec. to mid-April, they run to the E.; during other four, June to Sept., to the W. In April and part of May, as well as in Nov. and Dec., both winds and currents are variable. The greatest velocity of current was 2 m. per hour on the Great Chagos Bank; this was when the tide and current ran the same way.

Tides. There are regular tides on the banks and islands; flood sets to E.S.E., and ebb to W.N.W. It is H. W. on F. and C. of moon at 1 h. 30 m. Sometimes the tides and currents run obliquely to each other or against each other; in which case the currents are retarded or accelerated, causing rippings; and if there is much breeze, the swell becomes short and confused, and on the shoaler parts of the banks heavy rollers break at times, each wave having a rise and fall (by measurement) from 15 to 18 ft. This fact alone ought to prevent ships from crossing these banks when there is much swell; yet, as before observed, they are easily avoided; and the islands may be approached with safety, as they afford supplies to ships in want.

CHAGOS AS A MID-OCEAN COAL DEPOT.

Remarkably placed by nature in this central position in the Indian Ocean, this group commends itself to navigators as a most important site for an international coal-depôt, with a good light-house attached. Although more in the interests of China and Australia than of British India; yet (the Passage Charts show that) a Chagos Light-house would be a great boon to outward-bound ships at certain seasons; and, to the sailing-ships of Bengal, Madras, and Bombay, an important land-fall; by sighting which they could correct their chronometers, when making the Southern Passage to the Red Sea or Persian Gulf during the S.W. monsoon.

Diego Garcia is the place we recommend for a central coal-depôt. It is the *weather* island of the groups at that time of year—viz., the S.W. monsoon—when steamers from China and Australia most want a better *half-way house* on their way to Suez than Point de Galle. (See further remarks in the Chapter on Passages.)

MALDIVH ISLANDS.

(VARIATION OF COMPASS AT AD-DU ATOLL, 1° W.; AT MINIKOT, NO VARIATION.)

The Maldivh Islands, grouped together in clusters called Atolls, extend over a space of ocean which is 470 m. in length, N. and S., and 70 m. E. and W., or from lat. 0° 42' S. to 7° 6' N., and between lon. 72° 33' and 73° 44' E. There are nineteen Atolls or groups; in the centre of the chain they lie in double rows—E. and W. Atolls—with a space between of from 10 to 25 m.; at the N. and S. extremes of the chain the Atolls lie singly. **Barrier Reefs** encircle those Atolls which compose the S. half of the Maldivh group, but none of the Atolls N. of lat. 3° 30' N., have them, excepting in a few detached parts of their circumference. The islands are in general not more than 5 or 6 ft. above the level of the sea, so that the cocoa-nut trees on them appear on first approach to be growing out of the water. No ground is found with the lead at 200 fathoms' depth, close by the sea-face of islands and reefs; the descent of their sides is thus very abrupt.

The natives are of opinion that the islands decrease in number, and gradually waste away; in some the cocoa-nut trees are standing in the sea, in others the submerged black soil of the island is discernible at L. W., several feet from the dry beach; the S.E. side of an island in Phaidi Pholo Atoll is entirely gone, but marked by a banyan tree in the water. They say that some islands have disappeared entirely; and they instance, near Waidu Island, in Milla-du-Madu Atoll, a rocky shoal which was once an island. They, however, acknowledge that reefs have arisen from the water, and become habitable islands; inhabitants of Mali remembered the outer edge of a circular reef in their harbour to have had 2 fathoms over its shoalest part, which is now dry at L. W.

People. The whole Maldivh group is inhabited by a civilised race of people, who carry on a considerable trade with the British possessions in India, more particularly with Bengal, Chittagong, Ceylon, and the Malabar coast; and, being Mohamedans, their peculiarly built vessels occasionally make a pilgrim voyage to the Red Sea. They are expert navigators and sailors; schools for teaching navigation are found on some of the islands. They make and repair nautical instruments, such as the astrolabe and quadrant; they copy English nautical tables, and translate the rules of our navigation books into their own language, generally using our numerals, so nearly identical with the Arabic. They are an inoffensive, timid people, and there appears far less crime among them than with more polished nations; murder has been seldom known among them, theft and drunkenness very uncommon; being strict Muselmin, they are forbidden the use of spirituous liquors. The men in appearance are of a dark, copper colour, rather short, and in person not unlike the natives of Ceylon and the Malabar coast, but at Mali many exhibit in their physical conformation an admixture of the African, doubtless from the Zanzibar slaves, occasionally imported by Maskat vessels. Their language is different from that of either Malabar or Ceylon, though it adopts many words in constant use at the sea-coast; their women are not pretty, and, though less secluded than is usually permitted by Mahomedan custom, they are extremely alarmed at the sight of strangers. These islanders have been more than kind in their hospitality to ship-wrecked mariners. This was exemplified in their humane and liberal conduct towards the commander, officers, and crew of two vessels—the *Adonis* and *Vicissitude*—totally wrecked during the night, one on Collomandu Atoll, in 1835, and the other on Heawandu Pholo Atoll, in 1836; nor would they receive any payment, though it was liberally offered by the Government of India; presents, however, were accepted as a mark of friendship from the Bombay Government.

Government. These islands are governed by a Sultan, whose title and rank are hereditary; under him are six Wazirs or ministers of state, of whom the first in rank is styled Durimind, the chief or general of the army; but above these, and second only to the Sultan, is the Fandiari, the head priest and judge, civil and religious. The Hindigeri, or custom-master and public treasurer, is also a very great man; and last of all is the Amir-el-bahr, or master attendant of the port. All these functionaries reside at Mali, or King's Island, in lat 4° 10' N., lon. 73° 30' E. To the different Atolls are appointed one or two chieftains, styled Atoll-wari, as also a Katib to each Atoll, who is priest and judge. Every Atoll pays a certain fixed revenue, a portion of their produce, to the Government at Mali, and nobody is allowed to trade with foreigners or strangers except at Mali.

Trade. The whole of the export and import trade of this group of islands, carried on in foreign bottoms, is conducted at Mali, whither the produce of all the other Atolls is brought, the dealers from each carrying back in return the produce of other parts to supply the wants of their respective islands. The external trade of Mali consists of two branches, one carried on by traders resorting to that place from Chittagong, Point-de-Galle, the Malabar coast, and occasionally from

Maskat; the other by the islanders themselves in their own vessels. **Exports.** The foreign traders call regularly once a year, arriving about March, and leaving with the S.W. monsoon about July. They barter principally for bonito fish (goomal-mutch), of which two or three millions are shipped off every season; Ceylon and Sumatra are the places where the demand is greatest, the latter island being supplied by the Chittagong traders. Tortoise-shell, cocoa-nuts, coir-yarn, cowries, and a kind of sweetmeat, with a few mats, compose the other articles of export. The coir-yarn of these islands sells at a higher rate than the ready-made rope of the continent, it being much finer, and of a higher colour; the trade in this article is principally carried on in the boats of the islands. That part of the external trade, which is conducted by the natives themselves, is carried on chiefly with Calcutta, in boats of from 100 to 200 tons burden; they leave the islands late in Aug. or early in Sept., annually, having the S.W. monsoon in their favour, and return in Dec. with the N.E. monsoon. These boats, from their build and rig, are totally unfit to work to windward, or even to make moderate progress unless the wind be abaft the beam; but smaller trading boats, of about 50 tons, whose sailing qualities are somewhat superior, are also used occasionally in trading to Penang and Calcutta. **Imports.** The imports are rice, dates, salt, leaf tobacco, betel-nuts, coarse white cloth, cotton, red and white check cotton handkerchiefs, curry stuff, ghee, china ware, Indian pottery, and coarse brown sugar; and in small quantities steel, brass wire, thread, and waist-cloths of various colours.

The Bengal rupee is the current coin of the islands, and is used in all money transactions. Of cowries, 12,000, constituting one *kota* or *goolah*, can be purchased in the bazar of Mali for one rupee (which will be at about the rate of 500 for an English penny).

Port Dues. It has been remarked on the previous page that none of these islanders are allowed to trade with foreigners except at Mali, where all Government functionaries reside, and dues are exacted. Trading-vessels, therefore, are always conducted to Mali by pilots, whose boats board any vessel coming within range. (*See also*, Port Dues at Mali, page 581; and Supplies, page 570.)

Quarantine. If there be small-pox on board, the vessel is put under the strictest quarantine for forty days after the recovery of the person last affected. In case the disease was prevalent at the place from which the vessel comes, though there be no sickness on board, quarantine is nevertheless enforced, but the period is limited to what the Sultan may see fit to order.

Productions. The cocoa-nut palm is most extensively planted; rows of them, with occasionally the areca, line the roads; the nuts are esteemed superior to those of India, and, besides exporting vast numbers, the natives extract from the nut a kind of sugar, called *ghua*; the tree grows to a height of 70 to 90 ft., but the banyan tree is the largest on the islands, attaining to a greater height than the palms. The nuts of the areca palm (betel-nut) are far inferior to those of the continent. Screw pines yield some fruit. Bread-fruit trees furnish a useful variety of food. Almond and lime trees grow, with plantains and papaws, pine-apples, pomegranates, pumpkins, sugar-cane, sweet potatoes, and some other bulbous roots. Millet is grown to a small extent; but all the rice, which is the first article of vegetable food, is imported. On the Southern Atolls there is *least* cultivation but *most* rain. Cotton is grown in small quantity at some of the islands in Milla-du Madu Atoll (*see* page 584). Mats are made of a grass on Suadiva Atoll, but not in great quantity. Cowrie shells (the small money of the islands) are found in myriads. Of living creatures, rats are numerous on the islands, and destructive to the cocoa-nuts; tortoises are plentiful at Mali. Flying foxes are very plentiful, so are crows; there is only one singing-bird, small and black, called by the natives *colea*. There are a few snipe, ducks, bitterns, and the usual sea-birds, curlews, &c. Wild ducks come over in great numbers during Nov., and are caught in nets by the islanders, who consider them excellent food.

Coral fish of every hue abound. The sword fish is common, and sometimes found 18 ft. in length. Turtle, sharks, and porpoises are plentiful, and from them oil is obtained. The bonito fishery is the chief employment of the islanders, that fish being the principal article of food as well as of commerce; sometimes 1,000 are caught by one boat in a day, but 600 or 700 is the ordinary number. Some idea may be formed of the importance of this fishery when we learn that in 1824 (doubtless an exceptional year) no less a number than 7,600,000 were purchased by English vessels alone. At Sumatra, where the demand is greatest, such a quantity would fetch 152,000 Spanish dollars; but the ordinary reward of the fishermen's labour is about one-half the above, and sometimes not one sixth.

Climate. The unhealthiness of the climate at the Maldivhs has long been notorious, and is doubtless the great obstacle to foreign intercourse and internal improvement. The cause of strangers losing their health is partly the lagoons and marshes throughout the islands, and partly the unvarying temperature of the atmosphere. When the surveying vessels first visited the islands in

1834, the S.W. monsoon had just cleared away, and the thermometer ranged between 80° and 82° (*see also* Lakadivhs, page 307.) When the violent N.E. monsoon showers set in, it fell as low as 75° , but rose only to 80° ; and after that, the range was between 82° and 85° , till after the middle of the year, when the S.W. monsoon (blowing over the sea which has been so much reduced in temperature by the currents from S. of the line) again reduces it to 80° and 82° . These registries of the thermometer were taken in the shade on ship-board.

The sickness, to which strangers are most liable, is a bowel-complaint—a species of *gastro-enteritis*—which appears peculiar to these islands; the only remedy seems to be an immediate departure for the continent of India. The natives also are liable to it, for in one instance nearly the whole population of an island was carried off. With the exception of beri-beri, which attacked the Indian lascars and not the European sailors, there are few other diseases of importance. Ague occurred to those of the surveying party who resided on shore. Amongst the islanders intermittent fever prevails, and is difficult to be got rid of; all the British officers and men who remained on the island of Mali, during a part of the S.W. monsoon, were prostrated by it and compelled to leave.

Language. Three different kinds of written characters are found on Maldivh tombstones. The most ancient are called Dewehi Hakura, which were probably used by the first inhabitants, but now the knowledge of them is very limited, being confined to a few individuals at Mali; they are totally forgotten in the N. Atolls, but still retained in the S. Atolls; for the inhabitants of which, orders from the King's Island are written in this character, which is written from left to right. The next is the Arabic character, written from right to left. The third, also written from the right hand and called Gabali-Tana, was introduced when the Portuguese garrison at Mali were overcome, and Mohammedanism re-established by a chief and some people from the N. Atolls; it is now the common language throughout all the Atolls, though, as mentioned before, the most S. islanders have a dialect of their own. In consequence of the intercourse with traders from Bengal and other parts the language now spoken at Mali is intermixed with many foreign words; and, because the Gabali-Tana alphabet has only eighteen letters, some auxiliary letters from the Arabic and Persian are obliged to be used. Letters of the alphabet are used as numerals, and they reckon by *twelves* as we do by *tens*.

Religion. These islanders have a tradition that about 400 years ago the Mahomedan religion was introduced by a man from Persia, whose name, or that of the country from which he came, was Tabriz. Some time afterwards Christians, doubtless Portuguese Roman Catholics, came there and propagated the tenets of their faith, but they were soon expelled by a chief who belonged to Atoll Tilla-du-Mati, who re-established Mahomedanism amongst them on a secure footing. The tomb of Tabriz at Mali is held in great veneration, and kept in good repair. Shortly after his death some of his countrymen came in search of him, remained and died at Mali; their graves are about sixty in number, but only two had legible Persian inscriptions, bearing date 994 of the Hejra, which would correspond with A.D. 1578.

CHANNELS. Amongst the different Atolls there are good channels for ships, no soundings are obtainable between them, not even close to the outside of islands and reefs. Some of the channels are intricate, and only fit for steamers, as the currents run strong through them to E. or W., according to the season. Besides the channels which separate the different Atolls, there are numerous **openings or gateways** (called *bari* by the natives) through their exterior reefs; they are also very deep and used by the Maldivh boats in passing from one Atoll to another, and some will admit the very largest ships; inside is found safe anchorage in very smooth water of moderate depth, with a bottom of coral and sand. **By day** all the channels between the Atolls, and even those amongst the islands and reefs, may be passed through without anxiety, as all the coral dangers under water are visible at some distance from the mast-head. **By night** ships ought only to pass through the four larger channels between the Atolls.

These broad and safe channels are as follows:—

1st. **The Equatorial Channel**, between the N. end of Ad-du Atoll, in lat. $0^{\circ} 35'$ S., and Suadiva Atoll's S. end, in lat. $0^{\circ} 12'$ N. The detached island of Phua Moluk is situated a little to the S. and E. of the centre of this channel.

2ndly. **The One and a-half Degree Channel**, between Suadiva Atoll's N. extreme, in lat. $0^{\circ} 55'$ N. and lon. $73^{\circ} 15'$ E., and the S. extreme of Adu Mati Atoll, in lat. $1^{\circ} 47'$ N. and lon. $73^{\circ} 22'$ E. This is the usual *homeward* steamer channel during S.W. monsoon.

3rdly. **The Vaimandu Channel**, between Adu Mati and Colomandu Atolls, which is 15 m. in breadth, and in direction N.E. by E., and S.W. by W. Although this channel is safe, navigators would have less anxiety in making for and passing through the channel to the S. of it.

4thly. **The Cardiva Channel** (sometimes called the Five-Degree Channel), whose breadth is

25 m., its length 67 m., and direction about N.E. and S.W. The Island Cardiva lies athwart the way in mid-channel.

AD-DU ATOLL, erroneously called Phoolah Moloque by former navigators, is the S. termination of the Maldivh chain, and the smallest of all the Atolls, being only 10 m. from E. to W., and 7 m. from N. to S.; it is of half-moon shape, concave on the N. side. This Atoll is rich, well inhabited, containing about 500 people, and available for ships much in want of supplies. It has nine large and several small islands, the two principal are Hit-ta-du and Me-du (called also Hula-du, both names being those of villages on the same island). Hit-ta-du lies at the N.W. angle of the Atoll, Me-du at the N.E. extreme; between them there are two gateways into the Atoll along its N. concave face.

Gung Island, in lat. $0^{\circ} 42' S.$, lon. $73^{\circ} 6' E.$, is the most S. of the group, its E. end lies 8 m. to the S.E. of the N. point of Hit-ta-du, and on the same barrier reef, which is dry at L. W. To the E. of Gung lies Wilin-gili Island on a reef of its own, and on either side of it are the two best passages into the Atoll, called Gung and Wilin-gili Channels. From the latter, one continuous barrier reef extends N. to Me-du, the N.E. island, in lat. $0^{\circ} 35' S.$, lon. $73^{\circ} 10' E.$; and thence W. to the middle of the Atoll's N. face.

Supplies. The islands afford a few supplies of fruit, limes, poultry, eggs; water and fire-wood in abundance. The natives are very civil and obliging, and will exchange their articles either for money or rice, biscuit, sugar, salt, onions and garlic; they are extremely lazy and indolent, and very timorous, fearful of strangers, and would not be induced to assist a ship in wooding and watering, even if paid for it, unless obliged to work. They are under the government of the Sultan at Mali or King's Island; and the Atoll-wari, or chief of the Atoll, is the person to whom strangers ought to apply for assistance in getting supplies. Some of the natives can converse in the Hindustani, but their proper language is described at page 569. All these islanders are Mahomedans. Their principal occupation is making cotton cloths of white, red, and black colours mixed, all of which they themselves dye, and sell at a good price in the other Atolls. They are not allowed by their government to trade with foreigners, not even with the English, their allies; all their produce must be sold at the King's Island, Mali. They seldom visit ships passing, from fear of molestation, and it would be wrong of any ships stopping at these islands to allow their crew to intrude into the privacy of their houses, among their females, or wantonly and without permission take their fruit, cocoa-nuts, fowls, &c. They are poor and inoffensive, and have reason to regret the visits of some merchant ships.

Passages into Ad-du Atoll. There are four gateways into this Atoll: two on the N., and two on the S. side.

The S. openings are broadest and deepest, and may be used at night-time, and with a fair tide a vessel could work through them; but the best way is to adopt that opening through which she will have a fair wind. Gung Channel is $\frac{1}{2}$ m. broad, with no dangers in it, and depths from 13 to 17 fathoms, water; about a N.N.W. course leads through. Wilin-gili Channel, nearly 2 m. N.E. of the last, is 1 m. broad, and has from 13 to 20 fathoms, water, still deepening to 30 fathoms as a ship gets inside; the course through is about N.W., but as a vessel proceeds inwards, she will come upon three coral patches in succession, on these the sea breaks at times, but they are easily avoided by a common look-out.

The N. openings are neither so broad nor so deep, yet are safe and available for vessels coming from the N. with Northerly winds, or leaving the Atoll with Southerly winds, but they are too narrow to beat through. They are not easily seen by a vessel coming from the N., as the N. side of the Atoll appears like one unbroken reef; on a nearer approach, and almost central between the trees of Hit-ta-du and Me-du, there will be seen a small bushy islet and a high bank of coral stones, both on one reef, which divides the two channels. The E. one, the largest, is between 2 and $2\frac{1}{2}$ cables broad, having not less than 6 and 7 fathoms, water, its direction N.W. and S.E. The W. channel is narrower, yet longer, on a N. and S. course, with depths from 10 to 12 fathoms.

Tides and Currents. In both N. and S. passages, the tides and currents are strong; the flood sets into the N. openings, and the ebb sets into the S. H. W. at 1 h. on F. and C., when the rise and fall of tide is about 4 ft.

The currents about this Atoll are very strong, for six months they set W. and then back to E., according to the monsoon, but are subject to checks from variable winds. They commence to set W. about Jan., and to E. about June, with a velocity of from 40 to 50 m. a day, but at some 40 or 50 m. from the islands they decrease considerably in strength.

Anchorage. No soundings can be obtained outside of this Atoll; but within it, 30 and 35 fathoms are found in the centre, and 20 and 25 fathoms near the islands; the only detached reefs are a patch of 2 fathoms near Mara du Island, and the three patches already described, lying

in the centre of the Atoll between Wilin-gili and the N. channels. Near the W. sides of the E. islands a vessel can anchor in the N.E. monsoon, and on the N.E. sides of the W. islands in the S.W. monsoon, in smooth water; these are the most convenient anchorages for communication with the natives.

Winds. Being to the S. of the equator, Ad-du Atoll is almost without the influence of the S.W. monsoon, the winds and weather being very variable, subject to squalls and rain. The N.E. monsoon is felt in Jan., Feb., and March; but the winds are as much to the W. as to the E. of the N. point, at that time of year.

PHUA MOLUK ISLAND (centre), in lat. $0^{\circ} 17' S.$, lon. $73^{\circ} 23' E.$, to which the name of Addon Island was formerly given erroneously by navigators, is situated a little to the S. and E. of the centre of the passage (46 m. broad) between Ad-du and Suadiva Atolls, called the **Equatorial Channel**. The Island is 2 m. long from N.W. to S.E., and on an average $\frac{1}{2}$ m. broad; the trees are from 70 to 90 ft. high. It contains between 300 and 400 inhabitants, who are principally employed in fishing and weaving cotton cloth. Here resides one of the royal family from Mali, who is styled Di-di. From the islanders may be obtained turtle, fowls, eggs, fruit, lime, fire-wood, and fresh water; they often visit passing ships which show their colours. Some can converse in the Hindustani language. Phua Moluk may be approached quite close off the N., the E., and W. sides, where no soundings can be obtained; but off the S. end a shelving bank extends for $1\frac{1}{2}$ m., on which the surf breaks very high to a distance of $\frac{1}{2}$ m. from the Island; yet, on the extreme verge of this bank a vessel may, in moderate weather, anchor for a few hours in 6 and 7 fathoms, water. The bank is of hard sand, with small coral rock, and anchors do not hold well; its sides, like the Island, are precipitous.

Equatorial Channel. By this name navigators in general know the entire passage between Ad-du and Suadiva Atolls, but Phua Moluk lies athwart the way, about half-way between Ad-du and the equator; so that the Equatorial Channel *proper* is between Phua Moluk and Suadiva Atoll. This channel is free from dangers; a ship passing through, coming from either E. or W., ought with light winds to borrow over towards Ad-du; that, in case of calms and variable winds, she may not be drifted too close to Suadiva Atoll; but if this should happen, she might in the daytime easily enter one of the numerous gateways leading into Suadiva Atoll, described at page 572.

Tides.—Currents.—Winds. It is H. W. at Phua Moluk at 1 h. on F. and C. of moon; the rise and fall is between 4 and 5 ft. The ebb-tide sets to the W., the flood to E.; they are little felt except in retarding or accelerating the currents. The prevailing winds are from W. to the S. and S.S.E. from May to Dec., with much rain and squalls. In the latter month the N.W. monsoon (which prevails for nearly all the first half of the year from the equator to the Chagos Archipelago) commences with about a fortnight's hard squalls, and fresh gales from W. to W.N.W., with heavy showers of rain; but in Jan., Feb., and March the N.E. monsoon blows to the equator, and sometimes a little S. of it, the wind being generally in those months from N. and N.E. in the Equatorial Channel, with less clouds and rain than in the last half of the year.

SUADIVA ATOLL, called by the natives **Huah-du**, is one of the largest of the Maldivh group, being 42 m. in length N. and S., by 34 m. in breadth. Its S. extreme is 46 m. to the N. of Ad-du Atoll, but separated from the Island Phua Moluk by only 31 m., which space constitutes the Equatorial Channel *proper*. There are thirty islands in the centre of this group, where there is found a greater depth of water than in the interior of the other Atolls, and it is also less obstructed by coral reefs. The islands on the boundary are numerous, but only fifteen are inhabited. The aggregate population of this Atoll is about 2,000. The principal employment of the men is fishing; that of the women is weaving rush mats for couches, beds, &c., with rushes dyed of different colours, and of pretty patterns; a good mat will sell for from £1 to £3 sterling. The Island Gud-du on the S.E. side of the Atoll, is the principal place of their manufacture. The inhabitants of this group are much subject to elephantiasis, a dropsical swelling of the legs, so common at Ceylon and the Malabar coast, especially at Cochin.

Hun-da-du Island (the centre), in lat. $0^{\circ} 27' N.$, lon. $72^{\circ} 56' E.$, the residence of the Atoll-wari, the chief of the Atoll, is situated at the extreme W. of the group, at the N. end of a barrier reef, which is 19 m. in length and forms the S.W. side of the Atoll. It contains about 200 inhabitants, and good water, poultry, &c., may be procured. In the Westerly monsoon good anchorage may be had on the E. side of the Island in from 27 to 35 fathoms, water. To S. of Hun-da-du the barrier reef is thickly studded with islands, which at a distance in some places look like one large island; there is a projecting elbow of this boundary reef off the Island Nunda-ahli, which is over 10 m. in a S. by E. direction from Kan-da-du Channel; and from this Island the reef turns to the S.E. for more than 8 m., to the first of the S. entrances between the Islands Ma-tura and Fe-ur-wari; the last island, which terminates this S.W. barrier, is well inhabited, and has good water.

Ma-tura, the most S. island of the whole Atoll, lies to the E. of Fe-ur-wari, and between them there is a good broad opening, through which the course is N. and S. Ma-tura consists of a number of little islets on one coral reef, whose E. end, dry at L. W., projects more than $1\frac{1}{2}$ m. beyond the islands: round this there is a **good passage**, in lat. $0^{\circ} 12' N.$, lon. $73^{\circ} 10' E.$, at the very S. extreme of the Atoll, about $\frac{1}{2}$ m. broad, leading into the Atoll about N.N.W., and having not less than 9 fathoms in its shoalest part. The N.E. side of this passage is the reef which extends $2\frac{1}{2}$ m. from the S.W. side of Wah-du.

Gateways along the Equatorial Channel. Along the S. face of this Atoll, which for a length of 25 m. fronts towards the Island Phua Moluk, there are nine passages or gateways leading into the interior; eight are safe for ships, and, in case of being drifted near them, may be used to enter the Atoll at night, where anchorage may be had. Should the vessel not be able to pass out by the same openings, she may in the daytime steer boldly to the N. through the interior, in from 35 to 45 fathoms, water, passing occasionally some small coral islands and reefs, which are easily seen from aloft, and going out by one of the opposite gateways, as most in her route. Some of the islanders will gladly conduct them through for a few pounds of rice or bread.

Wah-du, about $1\frac{1}{2}$ m. long E. and W., and only half as broad, was, according to native account, once a very fertile and productive island with 1,200 inhabitants: but for many years past, from some unassigned cause, has been nearly deserted, and now contains not more than 100 inhabitants, very poor. The island is worth visiting; the ancient mosques, burial places, and other parts are very interesting. Close round its E. and N. sides there is a broad channel into the Atoll, on a W. course. This passage is more than 1 m. broad, but shoal water with patches of 3 and 4 fathoms (in most parts 7 and 8) spoil its N. part, so a vessel must borrow upon the Wah-du side, where depths of 25 and 40 fathoms are found; the shoal water is, however, convenient for ships to anchor upon in obtaining wood and water from that island. The tides are strong in this opening. Between Wah-du and Ghang gateways there are three others amongst islands; the first or W. one leads up N., and is very deep; the other two have a N.W. course through, with depths of 5 and 6 fathoms.

Ghang Island, lying half-way from Wah-du towards the S.E. point of the Atoll, is the largest of the group, and shows plenty of trees on more than $1\frac{1}{2}$ m. of frontage to the ocean. On both sides of the island there are good channels. That to the W., being broadest and deepest, is called Ghang Channel; it is $1\frac{1}{2}$ m. broad, with soundings of 30 fathoms throughout; as you enter on a N. course an island is seen in the centre, which may be passed on either hand, but on its sea-ward side a projecting reef of considerable extent points S. to the entrance of the channel. As the Atoll is entered, several islets and reefs will have to be passed, but all are plainly visible from aloft. **Guddu**, the principal island of the mat manufacture, lies about a mile from the N.E. point of Ghang, the intervening space affording a shoal and narrow passage into the Atoll. This island is the S. of several on one reef, looking at a distance like one island; the reef is nearly 6 m. long, and its N.E. island has plenty of cocoa-nut trees, which mark the W. side of the Kan-du hu-lu-du opening.

Kan-du hu-lu-du is the S.E. island of the Suadiva group, and has a fine wide opening on its W. side with 7 and 8 fathoms, water, leading N. into the interior of the Atoll; this passage is the last of those that border on the Equatorial Channel. From this island the barrier reef runs up N., with several islands on it, for 6 or 7 m. before another gateway is found.

Eastern Gateways. There are also nine entrances for ships along the E. face of the Atoll, between its S.E. and N.E. points. The first of these is 28 m. above the equator, past the N. side of **Mah-ra-rah**, in lat. $0^{\circ} 27' N.$, lon. $73^{\circ} 30' E.$ (the E. island of this Atoll), on a W. course towards a small island 2 m. within the Atoll. Of course a sailing vessel could only enter this and the other E. channels with a leading wind. **De-ah-du** and **Kunday** are two inhabited islands where good water is obtainable; between them there is a narrow but deep entrance with 17 fathoms, water; a W. course leads in, and then a vessel may anchor on the W. side of Kunday, if in want of water. Another entrance, with 10 fathoms, exists by the N. point of Kunday Reef, $3\frac{1}{2}$ m. above the last-mentioned gateway, and another with 8 fathoms, 2 m. farther N. **Nil-an-du**. A deep bight is formed in the 11 m. of boundary between Mah-a-du and the N.E. barrier reef of the Atoll. In this space there are five gateways; the middle one being conveniently situated at the bottom of the bight, round both sides of Nil-an-du Island, which is situated 39 m. N. of the equator, is inhabited, has good water and some supplies, with good anchorage in the N.E. monsoon. Nil-an-du N. passage leads into the Atoll on a W. course; the S. passage has a W.S.W. course. To N. of this island lies a reef, which is 4 m. in length N. and S., and has six islands on it; the N. one Mah-men-du is inhabited, and has a passage with 13 fathoms, water, between it and Ku-ber-du. **Willee-gillee** is only $\frac{1}{2}$ m. to N. of Ku-ber-du, and between them there is a very contracted passage, about 2 cables wide, but with 12 fathoms, water, the last of the five gateways in the N.E. bight.

This island has a few inhabitants, and stands on the S. extreme of the 11 m. of impassable barrier reef which forms the N.E. boundary of this Atoll: near it are four small islets, then nothing but reef for 5 m. till you come to Ma-mutah, two small islands, which are generally first seen by ships coming from the N.E.

North and N.W. Openings. On its N. and N.W. sides the Atoll is bounded by many detached coral reefs more irregular in position and outline than those as yet described; numerous safe passages exist between them, but in adopting these a careful mast-head look-out must be kept, as there are no islands on the N. verge of the reefs, though two or three lie about 2 m. within the boundary; these, the N.-most islands, are 5 m. and upwards from Ma-mutah. The N.-most reefs of the Atoll are in lat. $0^{\circ} 55' N.$, lon. $73^{\circ} 14' E.$, or 7 m. to N.W. of Ma-mutah.

Mah-foo-ree, in lat. $0^{\circ} 51' N.$, lon. $73^{\circ} 7' E.$, the principal island at the N.W. projecting angle of the Atoll (15 m. to the W. of Ma-mutah, this being the breadth of the Atoll's N. portion), is well inhabited, has good fresh water, and plenty of poultry, &c. It stands 1 m. within the N. point of its fringing reef, which extends also 4 or 5 m. to S.E. Mah-foo-ree entrance is wide, but Willee-gelly islet lies in the very centre, thus separating the W. passage, which is shoal with only 4 fathoms, water, from the E. one, which has a depth of 34 fathoms. Some islets and reefs to S. and E. of Willee-gelly must be avoided by a good look-out from the mast-head. The surveyors were detained under the lee of this island for fifteen days in Dec., 1836; the wind was blowing in hard squalls and fresh gales from W. to W.N.W. with heavy showers of rain. Anchorage is to be had in 10 fathoms, water, with the island bearing W., distant 1 m. A ship wishing to stop here for supplies, if coming from the N., ought to enter the Atoll by one of its N. entrances, and then steer to S.W. and to W., passing between some small islands towards Mah-foo-ree, which is the W.-most and largest. Between Mah-foo-ree, the N.W. island, and Tin-a-du, in lat. $0^{\circ} 31' N.$, (which with Kan-da-du and Hun-da-du form the W. projection of the Atoll's boundary), there are also nine passages into the internal water along nearly 30 m. of detached reefs, which form a **deep bight, dangerous** for a ship to drift into in calms and light winds. Here the ship *Surat* was wrecked in 1802, on the side of a fine opening, which lies 7 m. to S.E. by S. of Mah-foo-ree, and is the second entrance below that island. The bottom of the deep bight bears S.S.E. 8 m. from Mah-foo-ree, and N.E. 19 m. from Tin-a-du. Along this boundary there are **no tree islands**, but merely heaps of coral stones and sand, on only two of which are there any bushes, and this absence of conspicuous land-marks renders the bight dangerous; but a ship in extremity might run through one of the nine passages with the help of the large scale charts of the Maldivhs and a good look-out at the mast-head. The best of the gateways are on the Tin-a-du side of the bight, and the nearest one to that island bears from it N.E. 4 m.

Tin-a-du, the W. inhabited island of Suadiva Atoll, bears S.W. by S. a little S. from Mah-foo-ree, distant 22 m., and lies about 4 m. to the N. of Hun-da-du, where the chief of the Atoll resides (*see* page 571). This island is about 1 m. in extent, containing about 200 inhabitants, has good water and a few supplies. It lies $31\frac{1}{4}$ m. to N. of the equator. A ship approaching it from the W. or the S.W. would suppose Tin-a-du to be the most N. island of the Atoll, owing to the absence of any tree islands along the boundary which recedes to the N.E. from this point.

Should a ship wish to enter the Atoll, or if there is much chance of her being drifted into the deep bight to the N.E., she ought, if possible, to enter by the small but safe channel on the S. end of Tin-a-du, where there is a depth of 6 fathoms, although the passage is not quite 1 cable wide; but its S. bank is well marked, being an islet with low bushes and one single cocoa-nut tree (1836). And again to the S. of this islet there is another small entrance with a like depth of water, but the broader one, called Kan-da-du opening, to the S. of Kan-da-du Island, and 3 m. to S. of Tin-a-du, is the safest to adopt, and leads also to Hun-da-du.

Kan-da-du Opening, in lat. $0^{\circ} 29' N.$, is the most convenient for ships, and may be said to be the principal entrance into this Atoll, as it leads to the anchorage off Hun-da-du, the first described and principal island of the Atoll. It is a fine, broad passage, 1 m. in breadth, having not less than 6 and 7 fathoms, water. The centre of this opening is 1 m. N. of Hun-da-du, but another island called Mad-a-velly (uninhabited) intervenes and borders the S. side of the entrance. The anchorage within the Atoll, on the E. side of Hun-da-du, has been described at page 571.

Tides. Near Mah-foo-ree, H. W. occurs about 1 h. on F. and C., when the rise and fall is 4 ft.

The ONE-AND-A-HALF DEGREE CHANNEL, comprehending the space between Suadiva and Adu-Mati Atolls, is 50 m. broad, and free from dangers. It is adopted by vessels from the Cape, bound to Ceylon in the months of Oct. and Nov. A ship soon passes through, but should she be drifted near either Atoll and be unable to pass clear, she will find four or five openings into the N. part of Suadiva, and one large entrance near the S. extreme of Adu-Mati, between Henadu-Adu and Gab-du Islands.

ADU-MATI ATOLL. This small Atoll, in shape like a leg of mutton, lies lengthways N.E. and S.W. for 26 m., the former end being the smaller part; the greatest breadth is 15 m. Its boundary reef, which is of more regular outline than any other Atoll, has six gateways, four of which are available for large ships. That on the S. side has been mentioned as open to the One-and-a-half Degree Channel. The W., the N., and the E. sides have each one deep though narrow opening. The interior of the Atoll has numerous coral patches, all of which are discernible from the mast-head, as a vessel approaches them in succession on a clear day.

West Gateway. Mhowah, at the W. extreme of the Atoll, in lat. $1^{\circ} 54' N.$, lon. $73^{\circ} 14' E.$, is its principal island, where wood, water, and poultry are to be procured. It contains between 300 and 400 inhabitants, and trade is kept up with Calcutta every year by three or four vessels of their own construction, of from 80 to 100 tons burden. The W. or Mhowah Gateway, situated $1\frac{1}{4}$ m. to N. of the island, is described by the surveyors as a narrow but safe channel, although no soundings are shown on the chart. The course inwards is S.E., afterwards turning to S. and to E., and then to S. again, and finally to W., to avoid a horse-shoe reef which interposes between the entrance and the E. side of the island, where there is good anchorage in Westerly winds, in from 17 to 20 fathoms, water. There are two islands on the N. side of this entrance, which are used as places of interment to those natives who die on board their boats.

South Gateway. From Mhowah a continuous barrier reef, with several islands, extends 11 m. to the S.E., forming the whole S.W. side of the Atoll. Near the E. extreme of this reef stand the islands Ku-nan-du and He-nadu-Adu, looking like one island 3 m. long; off the last a reef extends nearly $\frac{1}{2}$ m. to E., marking the W. side of the **South Gateway**, in lat. $1^{\circ} 47' N.$, lon. $73^{\circ} 25' E.$, which is a large and safe opening for ships, being 2 m. wide, and with much deeper soundings than the hand-lead can show. Gha-du Island, which marks the E. side of this opening, lies to E.N.E. of He-nadu-Adu, a space of $2\frac{1}{2}$ m. separating them. Three islands lie just within this entrance on the W. side of the centre, thus allowing of two fair passages into the internal waters; one leads up on a N. course to E. of these islands; the other turns W. between the N. face of He-nadu-Adu and the three islands, after passing which several coral patches lie athwart the way; these are discernible from aloft on a clear day. Should a ship enter this gateway, being in want of wood, water, and poultry, she ought to proceed through the Atoll to Mhowah Island, where supplies are obtainable, taking care to avoid the above reefs.

East Gateways. From Gah-du the sea-face of the boundary reef goes in a convex curve to E., to N.E., and to N. for 15 m. before another opening is found, all this distance is thickly covered with islands. The openings are met with on either side of Mah-ba-du Island; the S. one is best, having 8 fathoms, water, the N. opening has only 3 and 4 fathoms; each has a width of 2 or 3 cables; a W. course leads into both of them. Mah-ba-du and the two islands, which form the N. and S. sides of these gateways, are inhabited.

N.E. Point of Atoll. At this, the narrow end of the Atoll, stands the large island Esdu, in lat. $2^{\circ} 7' N.$, lon. $73^{\circ} 35' E.$, whose fringing reef projects only $\frac{1}{4}$ m. to the E., bearing N.E. by N. 6 m. from Mah-ba-du; about a dozen islets intervene between the latter and Esdu. This island is 2 m. in length and well covered with cocoa-nut trees, so as to be a good land-mark. From the N.E. tip of the Atoll a very straight boundary reef, without a single island, extends for 15 m. in a direction S.W. by W., $\frac{1}{4}$ W. till you come to the first of the N.W. openings into the Atoll.

N.W. Gateways. Along the straight N.W. face of this Atoll two gateways are found. The first, called Wad-i-nu entrance, along the E. side of the little island of that name, is 18 m. from the W. end of Esdu, on the bearing given above. The other is N.E. $\frac{1}{4}$ N. 8 m. from Mhowah Island. A reef 2 m. long separates these two N.W. gateways. Wad-i-nu entrance, though the narrowest, being not 2 cables wide, is deepest and best. The other, along the E. side of Moonia-foori Islands, has not more than 4 fathoms, water, in it, and generally from 3 to $3\frac{1}{2}$ fathoms. From the last-named islands the boundary reef trends S.W. for 5 m. to a projecting elbow, thence S. for 3 m. to the Mhowah entrance already described.

VAI-MAN-DU CHANNEL, available for ships by night, has a width of 16 or 17 m. throughout its length, which is about 25 m. on a very straight course N.E. by E. $\frac{1}{4}$ E., which is the line of bearing of the sea-faces of both Adu-Mati and Collomandu Atolls, between which this channel lies. Although this channel is safe, navigators would have less anxiety in passing through the One-and-a-half Degree Channel.

Tides. It is H. W. in this channel, F. and C., at 3 h.; the rise and fall is about 4 ft. Flood-tide runs to the E., and ebb to the W., with a velocity of about 2 m. per hour at the springs; each tide is accelerated or retarded by the prevailing current.

COLLOMANDU ATOLL is of somewhat circular form, its greatest measurement from E. to

W. being 29 m., and from N.W. to S.E. 23 m.; the latter face, as it forms the side of Vai-man-du Channel, being flattened in. This Atoll is principally surrounded by barrier reefs, and in the whole circumference there are a dozen openings. There are many islands along the S. boundary but few along its N. margin; and in the interior only six are found, these are near the W. side. Numerous coral patches, dry at L. W., lie within the Atoll, but the general depths are from 32 to 42 fathoms. Of the twelve entrances into this Atoll, one is on the W. side; four along the Vai-man-du Channel, and the rest along the N. face of the Atoll.

West Gateway, in lat. $2^{\circ} 18' N.$, lon. $72^{\circ} 54' E.$, is a broad entrance, between the two principal inhabited islands of the group, He-lan-du and Karn-du-du, which are $2\frac{1}{4}$ m. apart. The passage in, which is 2 m. wide between the barrier reefs, has some shoal water in the middle, with coral rocks visible below water, on which are generally found 6 or 7 fathoms, yet in one spot there are depths of only 2 and 4 fathoms; this may be avoided by borrowing towards either island, where the water will be found very deep. Another island lies about 1 m. within the centre of this opening; and another N. of that, and rather more than a mile to E. of Karn-du-du. He-lan-du and Karn-du-du both afford good water, fire-wood, and poultry; and a vessel may choose anchorage on the E. side of either, according as the wind permits. The S.W. Barrier of the Atoll is a convex piece of reef 13 m. long, extending to S. from He-lan-du, then round by E. to Vai-man-du, in lat. $2^{\circ} 11' N.$, lon. $73^{\circ} 5' E.$, an inhabited island with good water, standing at the W. side of the next opening, the first of the S. gateways. There are several islands on the S. part of this barrier; the S.W.-most, called Fooree, are situated 5 m. to S.S.E. of He-lan-du; another called Kim-be-du, the most S. of all, is $1\frac{1}{4}$ m. to W.S.W. of Vai-man-du.

The S. Gateways are in close proximity, all facing the Vai-man-du Channel; they are formed by two islands which intervene between the S.W. and S.E. barriers. The opening between Vai-man-du and the first island, called Kan-he-me-du, is broad and deep on a N.W. course, but a large coral reef inside, rather more than a mile within the opening, compels a vessel to bear away to N. or to W. as the wind permits. The second opening is narrower but good, having 6 fathoms, water; but a vessel must borrow towards the island Kan-he-me-du, which marks the W. side of the entrance, to avoid some rocks which project from the little island on the E. or right-hand side of the entrance. The third opening is deep and safe, having 35 and 38 fathoms, water, between the last little island and Te-mar-rah, which stands at the S.W. extreme of the long piece of barrier reef that borders the Vai-man-du Channel.

The E. Gateway is situated 13 m. farther to N.E. by E., and the intervening barrier reef is thickly covered with islands. The opening is between Gu-rah-du (the N.-most island) and Deah-me-gelli, and has about 8 fathoms, water. From this entrance the N.E. extreme of Adu-Mati Atoll bears S.E. $\frac{1}{4}$ E. distant 21 m. The E. Boundary of this Atoll is, like that on the S.W., a curved piece of barrier reef, about 15 m. long, without any openings. The large island Phalah, in lat. $2^{\circ} 24' N.$, lon. $73^{\circ} 22' E.$, nearly 4 m. in length in a N. and S. direction, stands on the verge of this reef, and well defines the E. extreme of the Atoll, for there are no soundings obtainable $\frac{1}{4}$ m. from the island, which is well covered with cocoa-nut trees.

North Gateways. Along the N. face of this Atoll there are several of these openings; those close to the E. points of six straggling islands are said to be safe, though small, but the chart only shows soundings in three of them. The first of these openings has 5 and 7 fathoms, and is situated 3 m. to the W. of the island Willi-foori, which is the N.E. one of the group. Bdoro-ni Island, in lat. $2^{\circ} 34' N.$, lon. $73^{\circ} 6' E.$, marks the extreme N. point of the Atoll, and is just half-way between the N.E. and N.W. points. Bdoro-ni gateway is close round the E. side of that island, and has 7 and 10 fathoms, water. Half-way from Bdoro-ni to the W. point of the Atoll there are two other openings, one on either side of Kandu-foori Island; the first is close to the E. side of that island, the other is $1\frac{1}{4}$ m. more to the W.; both have plenty of water. To S. of these, along the W. side of the Atoll, there are no more openings till we come to the only W. gateway; neither has this boundary reef any islands as land-marks throughout a length of 10 m. till Wali-gandu, which stands within 4 m. of that W. gateway, near which island the *Adonis* schooner was wrecked in July, 1835.

KOODAH-HUA-DU CHANNEL, called after the island of that name at its W. entrance, the S. island of Nillan-du Atoll, is a narrow but safe channel. The W. entrance is only 10 m. wide, well marked on the N. by Koodah-hua-du Island; but not so well on the S., where it is bounded by that N.W. extreme of Collo-mandu Atoll which, at its most projecting part, has no islands or land-marks until you come to Kandu-foori Islands, which are nearly 5 m. within the channel's entrance, and bear from Koodah-hua-du Island S.E. by S. 10 m. The course through Koodah-hua-du Channel is E. by N. The Atoll on its S. side is soon past, and it shows a prominent point (the island Bdoro-ni) towards the channel, but the two Atolls on its N. side give this channel a

length of over 30 m., such being the distance between the S. islands of Nillan-du and Moluk Atolls. The tides in this channel also set, flood to E., and ebb to W.

The Atolls to N. of this channel lie in double rows—E. and W. Atolls—and, as the currents of the ocean are thereby more obstructed, they run through these narrow channels with greater velocity and uncertainty. The open space, nearly 20 m. in width, between the E. and W. groups, is, however, free from all dangers.

NILLAN-DU ATOLL (the most, S. of those that lie in double rows) is 40 m. in length N. and S., and is in reality two Atolls, being divided into two parts by a deep channel $3\frac{1}{4}$ m. wide, in which no soundings could be obtained. S. Nillan-du is of somewhat oval form, with the E. and W. sides rather flattened; in meridional length it is 21 m., and from E. to W. 13 m. Many passages admit of vessels entering the Atoll, but on the S.W. side it is least accessible. The general depths in the interior are from 27 to 35 fathoms. It is studded with many large and small coral reefs, some dry at L. W., others having several feet of water over them, but all are deep-to and easily discovered. On the E. boundary, islands are plentiful, and in one place thickly grouped together, but the W. side of the Atoll has only two or three. In the interior there are about twenty islands, more than half of which are towards the N. part, and upwards of 3 m. within the boundary. At Doo-rai Island, which is about 5 m. to N.E. of the W. gateways, there reside a number of working jewellers, who travel periodically among the different Atolls in pursuit of their calling.

The S. Gateways. Fronting Collomandu Atoll, there are three good openings; the first is $1\frac{1}{4}$ m. wide, with 9 and 10 fathoms, water, close to the E. of the island **Koodah-hua-du**, in lat. $2^{\circ} 40' N.$, lon. $72^{\circ} 53' E.$, which is inhabited, and affords some supplies of wood, water, and poultry; two small islands, at the W. end of a separate reef, mark the E. side of this opening. The second, 1 m. wide, with depths of 14 fathoms, is half-way from the above towards the S.E. point of the Atoll. The third is at the S.E. angle between the islands Warney and Kan-dim-bah; it is narrow but deep, having 20 fathoms, and a W.N.W. course leads in. **Kan-dim-bah**, in lat. $2^{\circ} 45' N.$, at the S.E. extreme of the group, is the S.-most of twenty islands on one reef; from it the E. side of the Atoll goes up due N. for 17 m., and in this length of boundary there are seven good openings; the first is 5 m. N. of Kan-dim-bah, and the rest occur at intervals of about 2 m., and on the S. sides of the different islands.

Foori, in lat. $3^{\circ} 1' N.$, lon. $73^{\circ} 1' E.$, is the N. island on the Atoll's E. side, and the last of the above openings, leads in on a S.W. course close along the S.E. side of Foori. From this Island the boundary reef turns to the W. for 5 m., where is found the first of the N.W. openings, a wide channel with 17 fathoms, water, between barrier reefs, but with no islands to point it out. The second and third of these openings are broader and deeper than the first, but, like it, have no islands or land-marks to distinguish them; they may therefore only be entered by vessels which unavoidably drift near them. The reefs which separate these N.W. openings have no islands, and therefore the N.W. extreme of the Atoll is unsafe to approach: the several islands, whose trees will be visible from a distance, are all more than 3 m. within the boundary reefs.

The W. entrances, along the W. side of the Atoll, are a little to N. of its centre; but between these and the Koodah-hua-du Channel there is not a single opening along 13 m. of boundary. These two W. entrances are on the S. sides of Mar-dali and Hu-lu-dali, both inhabited islands, the latter the larger of the two. E.N.E. is the course into the N. opening, in lat. $2^{\circ} 52' N.$, which, being between the two islands, is better defined than the other, and has 19 fathoms, water. An E.S.E. course leads into the S. one, which has nothing but the sharp tip of a long barrier reef to mark its S. side.

N. Nillan-du Atoll is a perfect semicircle on the E., but its W. side is rather dented in. There are not many islands on its boundary; only one on the W., one on the N., one at the S. tip, and the rest rather equally distributed around the semicircle. In the interior, where the general soundings are 25 and 35 fathoms, there are four islands and several large coral reefs dry at L. W. **Nillan-du**, the S. island, in lat. $3^{\circ} 4' N.$, lon. $72^{\circ} 53' E.$, is inhabited, and affords some supplies and good water; as it gives its name to the double Atoll, this island is or has been the most important one of the group. On its E. side is situated the S. opening into the Atoll, 1 m. wide, and with 20 fathoms, water; a course between N.N.W. and N. will lead in. The barrier reef, at whose S. point Nillan-du stands, stretches more than 4 m. to N.W. by N., allowing a good, broad, and deep passage into the Atoll along its N. end. Then comes a circular lagoon reef, round the N. of which there is another passage, narrow but deep; thence to Him-it-ti S. opening there is a piece of barrier reef, having a sea-face of more than 6 m.

Him-it-ti, the W. island, in lat. $3^{\circ} 15' N.$, though small, is an important one in the Atoll; it has high trees, and contains between 200 and 300 inhabitants, who are great traders and navigators,

sending annually to Bengal five or six vessels from 80 to 100 tons burthen. They have also a large school for instructing native youths in navigation, and they make some of their own nautical instruments. The fresh water of the island is, however, bad. It is said that the sea has for several years been gradually washing away this island. There are **W. openings** into the Atoll on both sides of Him-it-ti. That on the S. is more than $\frac{1}{2}$ m. from the island, has 6 fathoms, water, and takes an E. by N. course inwards towards another island which faces the entrance, and may be passed either to N. or S. The opening on the N. has 15 fathoms, water, and takes an E.S.E. course along the face of the reef which projects $\frac{1}{4}$ m. N. from Him-it-ti Island.

The **N. end of Atoll**, in lat $3^{\circ} 21' N.$, lon. $72^{\circ} 53' E.$, is marked by a clump of cocoa-nut trees on a little island; there is an opening with 15 to 20 fathoms, water, upwards of a mile off its W. side, and another broad opening on its E. side, with a little reef in the very middle. From this last opening, round the semicircular E. boundary to the S. point of the Atoll, other openings occur at every 1, 2, or 3 m.; some are very narrow, but all have sufficient depth of water for ships; without counting the N. and S. openings into this Atoll, there are ten passages around the semicircular E. half.

MOLUK ATOLL is of irregular form along its E. face, the N.E. and S. points being very prominent; whilst its W. boundary is very straight and nearly on one meridian throughout its entire length, which is 25 m. It is situated about 20 m. to the E. of the Nillan-du Group, and its S. point bears N.N.E. 15 m. from the N.E. point of Collomandu Atoll: these two points marking the E. entrance of Koodah-hua-du Channel. The Atoll altogether contains twenty-one islands, nine of which are inhabited, and have a population of 980; all are on the boundary reefs, except Moluk, the largest, which is nearly 1 m. within the principal entrance. In the interior of the Atoll there are no islands, but many coral patches, and the depth of water is from 28 to 38 fathoms on a sandy bottom; the greatest depth is 40 fathoms at the centre. The rise and fall of tide is about 4 ft., and H. W. occurs at 3 h. at F. and C.

Six islands in a cluster are situated at the Atoll's S. end, two are inhabited and possess good water, but they can only be landed upon from the internal water; the nearest entrance is the S.-most of the fifteen openings (all said to be safe, though small), that are found along the straight W. side of the Atoll; this entrance lies about 3 m. W.N.W. from De-lu-foori, the S. island, in lat. $2^{\circ} 46' N.$, lon. $73^{\circ} 24' E.$ From De-lu-foori the barrier reef goes N.E. by E. for 12 m., forming a bight to the S.E. point of Atoll; thence for 4 m. farther on a N.N.E. bearing to the Moluk opening. This S.E. quarter of the boundary reef contains more than half the islands of the group, and they are clustered at its two extremes; several heaps of coral stones, on some of which bushes grow, are here and there seen above the surf, which, even in the N.E. monsoon, breaks very high here from a long S.E. swell. **Moluk Island**, a large island, at 1 m. distance within the opening formed by the extremes of the S.E. and E. barrier reefs, may be known by a large banyan tree near its N. and centre part; and, when approached from the S.E., this is seen just mid-way between the Islands Molee and Vaivand which stand at the side of the gateway. Moluk Town is on the N.E. side of the Island, contains 200 inhabitants, and affords good water, plenty of wood, and a few supplies such as the Maldivhs produce (*see* page 568); the most convenient place for taking in water is between the town and Vaivand Island. Molee and Vaivand Islands have each a population of 200, but do not produce good water. The Atoll-wari resides at the former.

The **Moluk entrance**, in lat. $2^{\circ} 57' N.$, lon. $73^{\circ} 35' E.$, is $\frac{1}{2}$ m. broad between the tips of the reefs that project from Vaivand and Molee towards each other, those islands being not quite 2 m. apart. Soundings of 7 to 18 fathoms are found in it, the deepest water being to the S., and the passage into the Atoll on the S. of Moluk is also deeper and broader than that along its N.E. side, having 18 fathoms, water, deepening to 24 and 28 as you pass that island, in which depths you may anchor on a sandy bottom; whereas, the N. passage is contracted to a width of only 2 or 3 cables by shoal water projecting from both the E. side of Moluk and the S. side of Vaivand; however, with a fair wind, the centre of this passage is safe, having 8 fathoms, water, on a sandy bottom.

N. openings. From Vaivand the continuous boundary reef goes nearly straight about N.N.E. for 10 m. to the N.E. angle of Atoll, in lat. $3^{\circ} 7' N.$, lon. $73^{\circ} 37' E.$, near which are two inhabited islands called Ry-mun-du; thence it elbows round to the W. for more than 4 m. before another opening is found, then there are two passages by the E. sides of Mad du-weri and Dig-ghur-ru, little islands, both which are inhabited and have high cocoa-nut trees; these passages are very narrow, and more like dock gates, being about $\frac{1}{2}$ cable wide, but have not less than 7 fathoms, water. Between these islands and the N.W. angle of the Atoll there are three other openings in the barrier reef, but almost too narrow for ships to enter, and having no islands to point them out.

W. openings. From the N.W. point of the Atoll, in lat. $3^{\circ} 11' N.$, which is merely the elbow

of a barrier reef with only a few dry rocks to distinguish it, the W. side of the boundary reef goes very nearly straight due S. for 24 m. In this space there are fifteen openings, all safe for ships, though some are very small; indeed, almost at every mile an entrance is found, available for drifting into the Atoll, none of these passages have less water than 10 or 15 fathoms. There is only one island, **Too-ah**, in lat. $2^{\circ} 53' N.$, along this W. side of the Atoll, but it has neither inhabitants nor fresh water, and close to the S. of it there is a good entrance with over 30 fathoms, water, but there are coral reefs inside.

WAH-TER-OO CHANNEL and REEF. This channel, which separates Moluk and Pha-li-du Atolls by a space of 8 m., has in its centre a circular lagoon reef, with a diameter of 4 to 5 m., dividing it into two passages which are 2 and $2\frac{1}{2}$ m. in width, the S. being the larger; both are very deep, no soundings being obtainable with the ordinary deep-sea lead. Both these channels are rendered dangerous by the strength of tides and currents, and by the absence of land-marks on the N. side of Moluk Atoll. The S. end of **Wah-ter-oo Reef**, in lat. $3^{\circ} 13' N.$, lon. $73^{\circ} 23' E.$, is pretty well marked by two low, bushy islets, between which there is the only opening (with only water enough for ships' boats) into the lagoon, in which there are soundings from 12 to 20 fathoms on a white, sandy bottom. On these two uninhabited bushy islets there are some young cocoa-nut trees, and some wells in which the fresh water rises and falls with the tide, being drinkable only at low tides. **Ra-khi-du**, the S. island of Pha-li-du Atoll, marks well the N. side of the N. Channel. A vessel drifted into **Wah-ter-oo Channel** in the N.E. monsoon, may pass clear of all the Atolls either to N. or S. of Nillan-du, or between the two portions of that Atoll, according as the winds suit best.

PHA-LI-DU ATOLL has a more irregular outline than any yet described, being in shape like a gouty foot and leg, the sole of the foot being its S. barrier, and the toe its E. point; the Island **Ra-khi-du** forms the heel which marks the N. side of **Wah-ter-oo Channel**. There are no openings along the S. and E. sides, but at the S. point of the Atoll there are two; along the S.W. side there are nine; on the N.W. side there are three; and between the N. and E. extremes, in the deep bight, there are sixteen safe openings. There are only ten islands on this Atoll, five inhabited, with a population of 320. The chief of the Atoll resides at **Tin-a-du**, near the centre of the deep bight on the Atoll's N.E. side. None of the islands afford wholesome drinking water, what they have is brackish, and the natives catch all the rain water they can by every available appliance; the cocoa-nut trees are very useful for this purpose, leaves being tied round the base of their trunks to act as pipes in conducting the water into jars. Of supplies, fire-wood is plentiful; a few fowls, some limes and fruit, and a few turtle may be procured.

S. and W. openings. The Island **Ra-khi-du**, in lat. $3^{\circ} 19' N.$, lon. $73^{\circ} 27' E.$, stands between the two S. openings, both which are fine safe passages with 20 to 30 fathoms, water; they are 2 m. to N.N.E. of **Wah-ter-oo Reef**. From them the general direction of the boundary is N.W. for 15 m. to the Atoll's W. point, and in this space there are nine openings, but the absence of land-marks suffices to deter vessels from approaching this W. side. From the W. point of the Atoll, where there is a narrow opening, the boundary goes in a N.E. direction for 13 m. to **Phu-li-du**, in lat. $3^{\circ} 41' N.$, lon. $73^{\circ} 24' E.$, an inhabited island at the N. extreme of the group; along this N.W. face there are three openings, all ill defined.

N.E. openings. Of these there are sixteen safe passages, though narrow. The first of these occurs at the distance of $1\frac{1}{2}$ m. to E. of **Phu-li-du**; the second has no land-mark to point it out, and a sunken rock lies in mid-channel; the third lies 1 m. E. of **Dhig-gheri**, which bears E.S.E. 5 m. from **Phu-li-du**; the next two are 3 m. farther S., on either sides of **Alli Mattar Island**. Three islands lie at the bottom of this N.E. bight; **Tin-a-du**, the N. one, is the residence of the Atoll-wari; but the openings, between these islands and some reefs which intervene, are so very narrow, and such a heavy swell sets directly upon them in the N.E. monsoon; and the tides and currents are so strong, that it would be hazardous for a vessel to attempt these passages, more especially with very light winds. Between these islands and **Fa-ta-o**, which marks the E. point or toe of the Atoll, there are other openings, but so narrow are they and not distinguished by any land-marks, that it may be said of this piece of barrier, as can be truly said of the whole S. face of the Atoll, that it is one continuous barrier reef.

ARI-AD-DU and PHU-LI-DU CHANNELS. The first lies to the W. of Pha-li-du Atoll, and between Nillan-du and Ari Atolls; it is 10 m. in breadth, free from danger, and has no soundings. The other is between Pha-li-du and S. Mali Atolls, and is $8\frac{1}{2}$ m. wide. Vessels can conveniently pass through these channels, should they unavoidably drift near them.

Tides. The tides set strongly through them during springs; periodically retarded or accelerated by the current. Flood sets to E., ebb to W.; H. W. at $2\frac{1}{2}$ h. on F. and C. of moon.

ARI ATOLL. This W. Atoll is situated to the N. of Nillan-du and to the W. of Pha-li-du

and Mali Atolls. Its shape is oblong, being 48 m. in length N. and S., by 17 m. in E. and W. breadth. It contains some half a hundred islands, the greater number being situated along its E. boundary, and they are generally small. This Atoll, in common with those to the N. of it, has no continuous barrier reef round it, except a small space at its S. extreme. On the W., the N. and E. sides, there are numerous good passages leading into the Atoll, safe for any ship to enter; on the W. there are fifteen, the half of which are very broad; one very broad one affords entrance at the N. extreme of the group; more than thirty occur along the E. side, some small, but all safe; whilst at the S. end only one break occurs in the barrier reef, and in this passage stands the Island Ari-ad-du, allowing a safe entrance on either side of it. In the interior there are numerous large coral reefs, not all dry at L. W., some having 2 and 3 fathoms, water, on them; many of those, whose edges are dry at low tide, have deep lagoons inside; all may be avoided on a clear day by a good look-out. The general soundings inside the Atoll are 30 to 40 fathoms; the influence of spring-tides is felt amongst the interior coral reefs.

S. Entrance. Ari-ad-du Island, in lat. $3^{\circ} 30' N.$, lon. $72^{\circ} 50' E.$, stands in the middle of this passage, which leads out of Ari-ad-du Channel, and is 10 m. to the N. of the N.W. point of Nillan-du Atoll; depths of 26 and 28 fathoms are found on both sides of the island; the passages, though narrow, are safe, leading on a N. course into the Atoll. Ari-ad-du and the Island Mah-magelly, to the W. of it, are inhabited, and afford good fresh water. The W. side of the Atoll is tolerably straight in a general N. direction, but is formed of several large, circular and oblong lagoon reefs; the fifteen intervening water-spaces are mostly broad, and occupy as many miles of the Atoll's length as the reefs do. The first passage, about 9 m. W.N.W. from Ari-ad-du, is narrow, as are also the next two; but the fourth and fifth are more than 2 m. broad; the inhabited Island Man-du (centre), in lat. $3^{\circ} 44' N.$, standing between them on a reef nearly 4 m. long. All the rest of the passages are deep and safe, those on either side of Mah-lus and Feri-du being better defined than others by the high trees of those inhabited islands. The four islands Man-du, He-men-du, Mah-lus, and Feri-du are inhabited and afford wood, water, and some few supplies. The N. openings of this W. side are situated at $1\frac{1}{2}$ m. above and below Mati-wari Island, which is inhabited, and also affords good water and some few supplies.

The N. extreme of Ari Atoll, in lat. $4^{\circ} 17' N.$, lon. $72^{\circ} 45' E.$, is an oblong lagoon reef extending 6 m. to N.N.E. of Mati-Wari, and affording a broad deep N. entrance, with soundings of 25 to 29 fathoms, a convenient space for ships to anchor throughout a space of many miles, as all dangers are visible. Then comes another reef and another good passage, at the E. of which stands the Island Oku-lus, which is inhabited, and affords some few supplies, with fire-wood and water. A little islet lies 1 m. to N. of Oku-lus, and another at the same distance on the E.; and hence a chain of little reefs, extending for 6 m. to the S.E., make the margin of the Atoll, till we come to the N.-most of the numerous islands which lie along this nearly straight E. side. Many are the E. passages leading into the Atoll, occurring at intervals of less than 1 m.; some are small, but all safe, if a good look-out is kept. The S.E. opening is the broadest, and is well marked out, being to the N. of the large Island Dhig-hurah (the N. point), in lat. $3^{\circ} 34' N.$, at the N.E. end of a barrier reef, which constitutes the S. extreme of Ari Atoll.

ROSS ATOLL is a large lagoon reef, situated $4\frac{1}{2}$ m. off the N.E. point of Ari Atoll, and connected to it by a plateau, with soundings of 100 to 140 fathoms. This miniature Atoll is circular, its diameter being $4\frac{1}{2}$ m.; the N. and W. sides are one continuous barrier reef; the E. side is also one reef, but entrances occur at the N.E. and S. extremes of the Atoll. The S. entrance, in lat. $4^{\circ} 15' N.$, lon. $72^{\circ} 58' E.$, only fit for small vessels, lies between two islands, Coura-mat-ti and Rus-du. The N.E. entrance has 8 fathoms, and is about 1 m. to N. of Weli-gan-du Island. In the interior of the Atoll there are soundings from 15 to 20 fathoms, but detached coral patches abound.

TO-DU ISLAND (centre), in lat. $4^{\circ} 26' N.$, lon. $72^{\circ} 56' E.$, situated $5\frac{1}{2}$ m. to N. of Ross Atoll, is a solitary island at the W. entrance of Cardiva Channel; it is steep and safe to approach, the reef which surrounds it being nowhere a cable's length from the trees, which cover the island and make it visible 20 m. from a vessel's mast-head. It contains between 200 and 300 inhabitants, has good water and some supplies; the islanders are principally employed in fishing. The Islands To-du and Cardiva being such excellent land-marks, make the Cardiva Channel a most useful cut through the Maldivh Archipelago. (See page 586.)

S. MALI ATOLL is situated 23 m. E. of the centre of Ari Atoll, the intermediate space of sea being perfectly free from dangers and much sheltered from the ocean swell. It is also separated on the S. from Pha-li-du Atoll by the Phu-li-du Channel, which is a little more than 7 m. broad, and from Mali Atoll on its N. by War-du Channel, not much more than 2 m. broad. In shape it is oblong, 20 m. in N. and S. length, by 12 in greatest breadth, which is towards the N. end. It

contains twenty-two islands, three only inhabited, counting altogether 200 people. None of them afford good water or supplies, they are nearly all situated along the E. boundary, only three or four being on the W. side, but there are safe passages on one or both sides of all except the four or five smaller islands at the S.E. extreme of the group, which stand on a piece of barrier reef 8 m. in length. The general depths in the interior are from 25 to 32 fathoms, sandy bottom, but it is full of reefs and little coral patches, which are, however, easily avoided, by a good look-out from the mast-head. **The S. opening**, in lat. $3^{\circ} 49' N.$, lon. $73^{\circ} 24' E.$, is good, $\frac{1}{2}$ m. broad, with soundings from 5 to 8 fathoms, between the W. tip of the S.E. barrier reef, and an islet composed of a heap of dry, coral rocks. From this the Atoll's W. side goes up N. nearly straight for 15 m., having several safe openings, the broadest and best being in lat. $4^{\circ} 1' N.$ Hence the boundary curves round to N.E., affording two or three more but small passages through it. At the N. end of Atoll, on either side of **War-du Island**, in lat. $4^{\circ} 8' N.$, there are good openings leading out of this Atoll into War-du Channel.

E. side. To the E. of War-du openings a barrier reef extends nearly 5 m., having near its E. extreme the small Island **Fino-rah**, in lat. $4^{\circ} 6' N.$, lon. $73^{\circ} 31' E.$, close to the S. of which lies the first of the E. passages into the Atoll, a fine opening nearly a mile broad, and having another Island, **Him-bu-du**, about $1\frac{1}{2}$ m. within the entrance, and facing it as a vessel leads in on a W. course. From this opening the E. side of the Atoll goes very straight on a S.S.W. direction for 17 m. to its S.E. extreme, having in this length of boundary four or five openings, of which no description is given by the surveyors, but by the chart they appear to be as safe as those on the N.W. side of this group.

War-du Channel, separating the N. and S. Mali Atolls, is at its narrowest part less than $2\frac{1}{2}$ m. wide, but its depth is great, no soundings being obtainable at 200 fathoms. The tides in it are very strong, flood sets to E. and ebb to W. During the monsoons, that tide, which is accelerated by the prevailing current, runs with great velocity 4 m. an hour, causing a great rippling and whirlpools in the sea, which in light winds it is difficult to steer a ship through.

MALI ATOLL, or **N. MALI ATOLL**, the principal one of the whole Maldivh group, lies to the N. of the last described. Both N. and S. groups are included by the natives under the name of **Mahl**, or **Mali**, but being separated by a channel without soundings, they are certainly two distinct Atolls. This N. Atoll is of irregular shape, tapering at the N., the S., and E. ends; the entire W. side is a convex, the N.E. and S.E. faces concave. Its N. and S. length is 32 m.; its N. island, **Kaghay**, in lat. $4^{\circ} 42' N.$, lon. $73^{\circ} 30' E.$, and the S. one, **Mali**, being on the same meridian: its central width is 23 m. It contains about fifty islands, twelve inhabited, and innumerable coral reefs. The general depths in the interior are from 25 to 35 fathoms, sandy bottom, but in passing through a sharp look out is required, even in day time, so numerous are the coral patches; the eye, and not the chart, must guide a vessel through. **Caution** is needed on the part of the navigator, as all the openings into this and other Atolls are not distinctly seen 3 or 4 m. off; the barrier presenting in appearance one continuous line of reef, alarming for strangers to approach. But no danger need be apprehended when the wind is steady, and by nearing them to the distance of 1 or 2 m., the channels are distinctly seen, unless the sun glares in the face.

Mali, or **King's Island** (the flag-staff or N. side), in lat. $4^{\circ} 10' N.$, lon. $73^{\circ} 30' E.$, is the capital of the Maldivh group, and at the very S. of this Atoll, bearing N.E. $4\frac{1}{2}$ m. from War-du, the N. island of the S. Mali group. It is oval-shaped, in length about 1 m., by $\frac{1}{2}$ m. in breadth. Its S. side is inaccessible to boats, being one unbroken reef, just awash; but the rest of its circumference has a lagoon within a wall of coral, roughly built up occasionally with a little labour; this gives excellent shelter to the boats of the natives, there being from 6 to 12 ft. water within it at the N. side of the island, where its entrance or gateway is, which at night-time is closed by a boom being drawn across. Near this gateway stands the principal fort of the island, a solid mass, about 20 ft. high, faced with stone; here the flag-staff is, and several good cannon. The fort wall extends also round the E. and W. sides of the Island, but not on the S. The Sultan's palace is a large upper-roomed house, with a peaked roof, covered with thick sheet copper; in a walled enclosure, surrounded by a shallow moat, comprising an area of about a quarter of a square mile. There are several mosques in the town, and a tower 40 ft. high, from which the crier calls the faithful to prayer at certain hours. Mali contains between 1,500 and 2,000 inhabitants; many are traders, but the most common employments are fishing, gathering cocoa-nuts, drawing toddy, weaving cloth, and collecting the small cowries which pass as money. None of the islanders in other Atolls are allowed to trade with foreign vessels, except at Mali, where all trade must be carried on. The Sultan attires himself like an Indian Musulman, but no other person dares to wear more than a cloth around the loins, and a plain red handkerchief on the head; nor can any but the Sultan have an umbrella carried over him, for it is one of the insignia of sovereignty.

The Sultan and head men are much pleased if a ship on arrival salutes with a few guns, which compliment they return, and then the Amir-el-Bahr, or Master Attendant, comes on board to inquire after the health of the ship's company, that no contagion, particularly small-pox, may be brought to that place. The climate at Mali is, as regards the feelings, neither oppressive nor disagreeable, yet it is very unhealthy to strangers, either European or Asiatic, and the latter seem to feel its effects first. Nobody ought to sleep on shore, and if this rule be acted upon, a few days' or weeks' residence will not be attended with ill effects. Good water may be obtained at Mali, but no supplies.

Port Dues. On the arrival of a trading vessel from the E. near any of the Atolls, a boat immediately puts off to her, and conducts her to Mali; where the pilot receives a fixed remuneration from the Hindigeri. On the vessel anchoring off the town of Mali, the Amir-el-bahr hails the pilot to inquire whether there be any sickness on board. Should there be none, he goes on board, when it is customary to present him with a piece of chintz or a shawl, and he then conducts the master of the vessel on shore. The port charges and duties are moderate. The sum of forty rupees is payable by every foreign trading vessel, without reference to her size, or to the period of her stay; but from a large ship one candy weight of merchandise is exacted in addition. Besides, there is a duty consisting of fifty bags of rice, which is charged under the name of *hadiyeh*, or presents to the Sultan and officers of Government; of this the Sultan receives five and a half bags of rice, with seven red handkerchiefs, to be carried to his palace at seven different periods, the bearers receiving back one handkerchief and a quantity of betel-nuts; the remainder of the *hadiyeh* goes to the officers of Government and the Sultan's relatives, according to a list provided by the Hindigeri. These presents may be made either in rice, salt, cummin-seed, chillies, coriander-seed, which are taken by measure; or, in dates, catechu, turmeric and onions, which are taken by weight, 6 *guls* (one and a half pounds) in weight are equivalent to 6 bamboos, or 12 seers in measure. The Amir-el-bahr, who superintends this business, is entitled to a sixth part of everything given. Besides, and on delivery of the above, forty cotton handkerchiefs are required to be given, the cheapest of any colour being taken without objection. And then there is a small present of five rupees in a handkerchief, required to be sent to the Sultan, after the other presents are delivered, to obtain permission to barter. (See Trade, page 567.)

Anchorage. There are no soundings to the S. of Mali, but round the inner side of the island the depths are from 28 to 25 fathoms, sandy bottom, in which depth a vessel may anchor anywhere as most convenient. As good a berth as any is with the flag-staff bearing S.E., and about $\frac{1}{4}$ m. distant. During the S.W. monsoon, from June to Dec., vessels moor on the E. side of a lagoon reef, which bears N.N.W. $1\frac{1}{4}$ m. from Mali; on the edge of this reef are several anchors, dry at L. W., to which vessels make fast, with a stern anchor to the E.

Tides. High water on F. and C. occurs at Mali at 12 h. 30 m.; rise and fall 3 ft., sometimes 4 ft. The flood-tide sets past the S. side of the Island to E., the ebb to the W.; when accelerated by the current they are very strong.

Entrances. There are good and safe passages to Mali Anchorage on each side of the Island, available with S. winds; but, with the Northerly or N.E. monsoon, ships are recommended to adopt the next large opening, which is 6 or 7 m. N.N.E. of Mali, and then to pass down between the islands and reefs. This opening is nearly $1\frac{1}{4}$ m. broad, with soundings from 28 to 25 fathoms, sandy bottom; its N. side is well defined by a remarkable clump of cocoa-nut trees standing at the S. extreme of a long reef. On the S. side of this entrance there are two small cocoa-nut islands, and a sand-bank, with bushes: a vessel may pass between all these, but the best passage is round their N. sides, when, after rounding the sand-bank, she may steer S.S.W. and then S., towards Mali Flag-staff.

Approaching the W. side of Atoll in the Westerly monsoon, ships will have entered the Cardiva Channel between Goidu Atoll and To-du Island. Passing close on the N. side of the latter, if bound to Mali, they should steer S.E. by E. for the War-du Channel, War-du Island being 35 m. S.E. from To-du Island, which being visible 20 m. from mast head, as also is Mali, the one will not be lost sight of before the other is seen. Gerahva, or Divided Island, lying 6 m. W. by N. of Mali, is $\frac{1}{4}$ m. within the line of boundary, and has a passage on the S. of it into the Atoll on a N.E. course; the reef on which it stands extends nearly 2 m. to the W., and forms the S.W. point of the Atoll. To N. of Gerahva there are nine openings between lagoon reefs along the W. side of this group; the largest one is abreast the Island Haim-bud-du, which is nearly 2 m. within the boundary, in lat. $4^{\circ} 28\frac{1}{4}'$ N. Of N.W. openings there are three small but safe ones; two at the sides of a thick, bushy islet, Okani-foori, situated 9 m. to N. of Haim-bud-du; the third opening is 1 m. farther to the N.E.

N. part of Atoll, and Gafor Reef. The N. part of the Atoll is a lagoon reef 2 m. long,

which has passages on either side into the internal waters; both have 23 and 24 fathoms, water; one is to the E. of a sand-bank, the other to the E. of a pile of coral stones, which lie $1\frac{1}{2}$ m. to N. of **Kaghay**, in lat. $4^{\circ} 42'$ N., the most N. island of the Atoll, with a clump of trees on it. To N. of this lies the island and lagoon reef of **Gafor**, separated from the body of the Mali Atoll by a narrow, deep channel, $1\frac{1}{2}$ m. wide, with no soundings in it (thus being entitled to call itself a *separate* Atoll, as much as the similar lagoon reefs called **Ross** and **Goidu** Atolls). **Gafor Island** is situated exactly 2 m. N. from the N. point of Mali Atoll, and stands at the E. extreme of its own reef, where there is no entrance into its lagoon; the only two openings it has are in the centre of the N.E. and N.W. faces, but they are very minute, and have no marks to distinguish them.

E. side of N. Mali Atoll. From the N. extreme, the boundary of the E. side takes a S.E. direction for 20 m., and thence to S.W. for 20 m. to the Island **Mali**, standing at the S.E. point of Atoll. Several large lagoon reefs, with passages between them, are found along this N.E. side of Atoll; the first are on both sides of **Hellen-geli**, a long, low island, with a peculiar single cocoa-nut tree (1835), at 5 m. to the S.E. of **Kaghay**; the rest of the openings have no marks to guide a ship, she may pass through by keeping a good look-out. The E. islands of Atoll, **Mefaing-foori** and **Devam-poori**, in lat. $4^{\circ} 27'$ N., lon. $73^{\circ} 42'$ E., are 14 m. to S.E. of **Hellen-geli**. As a vessel approaches them from the E. within 16 m., they sometimes look like one island; at the same time a high clump of trees will be seen beyond them, this is the little Island **As-du**, whose cocoa-nut trees are very high, but lying some 2 or 3 m. within the boundary. Two good entrances occur, with **As-du** bearing W.S.W. and S.W.; on which courses a vessel can enter the Atoll with a N. wind, and thread her way down to **Mali** by a good mast-head look-out. **Devam-poori** has 150 inhabitants, and good water; they can supply pilots for **Mali**, but it is doubtful if they will come out, the islanders being so timid and reserved. From the E. point of the Atoll, the long lagoon reef on which **Devampoori** stands extends in a S.W. direction for 6 m., where three small cocoa islets are formed at its tip, affording a passage between them and **Toolis-du**, but not recommended. Another passage occurs after other 5 m. to the S.W., round the S. sides of three smaller islets, on one of which there is a remarkable clump of trees. But the best and largest opening (which is 7 m. N.N.E. from **Mali Island**), lies 3 m. farther to S.W., or 15 m. from the E. extreme of the group; this passage should be adopted by vessels bound to **Mali** in the N.E. monsoon.

CARDIVA ISLAND AND CHANNEL. This channel comprises the space of ocean between **Mali** and **Ari** Atolls on the S.E., and **Phaidi-Pholo**, **Mahlos Mahdu**, and **Goidu** Atolls on the N.W. Its central part has a width of 24 m., and its extreme length is between 70 and 80 m. in a N.E. and S.W. direction. **Hoo-waili-foori Island**, in lat. $5^{\circ} 17'$ N., lon. $73^{\circ} 33'$ E., with a high clump of trees, near the S. end of **Phaidi-Pholo** Atoll, clearly marks the N. side of the E. entrance into **Cardiva Channel**; but its S. side is not so well defined by **Gafor Reef**, which has no land-marks along its N. and W. sides. The landfall at the W. entrance of **Cardiva Channel** is not so good, as the tree islands of **Ari** and **Goidu** Atolls stand some 4 or 5 m. within the prominent points of their boundary reefs; but **To-du Island**, in lat. $4^{\circ} 26'$ N., lon. $72^{\circ} 56'$ E., at 10 m. within the channel, does for the W. what **Cardiva** does for the E. entrance.

Cardiva Island, or **Cardoo** (centre) in lat. $4^{\circ} 58'$ N., lon. $73^{\circ} 26'$ E., is covered with a dense mass of high cocoa-nut trees, contains about 200 inhabitants, and affords good fresh water and some few supplies. Its S.E. side is convex and deep-to, having no soundings in 240 fathoms, water, close to the beach. On its N.W. side there is a circular reef, having a lagoon inside, where the natives snugly anchor their boats off the village on the N. side of Island. The entrance into the lagoon is near the N.E. point of Island, marked by a few sticks placed as a beacon; a ship's boat can only land on **Cardiva** by passing this one boat-passage through the fringing reef. There is generally a heavy surf round this Island and reef, except at the boat-opening.

Cardiva Channel is extremely useful for ships to and from India. None ought to attempt to work through against the strength of either S.W. or N.E. monsoons; with wind and current against them, it would be next to impossible. But it may be advantageously adopted when the monsoon is fair, or at the change of monsoons, when the winds are light and variable, as for instance in Nov., when an outward-bound ship has crossed the line to W. of the **Maldivhs**, and finds the wind hanging too much from E. of the N. point to allow of her taking the 8° or 9° channel without much loss of time, she may then use the **Cardiva Channel**, and make **Ceylon** or the coast of **India** by **Cape Comorin**. (*See Wind-Chart for Nov.*) At the change of monsoons calms are very frequent, yet little or no danger is to be apprehended, this channel being very capacious.

Tides. The flood-tide in **Cardiva Channel** sets E.N.E. and ebb W.S.W.; H. W. at 12 h. at F. and C. of moon. During the N.E. monsoon, little or no flood-stream is felt, but the strength of the ebb is considerably increased by the strong current with the wind. Contrariwise in the S.W. monsoon the flood is strong, with little or no sensible ebb-stream.

GOIDU, or HORSEBURGH ATOLL, a lagoon reef, (the tree-islands of which are about equidistant 25 m. from Cardiva and from To-du, bearing N. from the last, and W. by S. from the first), marks the N. side of the W. entrance of Cardiva Channel, and is separated from Mahlos Mahdu Atoll by a deep space about 6 m. wide. This Atoll is small, of an oval shape, its greatest E. and W. length being 10 m., which is more than double its breadth. It has three large islands on the N. and E. parts, all inhabited with an aggregate population of 200; they afford wood, water, and some supplies. **Goidu**, in lat. $4^{\circ} 58' N.$, lon. $72^{\circ} 58' E.$, is the E. island and largest. The only entrance into the lagoon, the Dorah-kandu, is on the S. side of Atoll; to make this from a distance, a N.E. course should be shaped for Fhen-du (seen from aloft), the central of the three large islands, until on that bearing the several stony islets are sighted which bound both sides of the entrance; then the mast-head look-out will detect the passage between them, which is apparently 1 m. broad, but deep water is confined to the W. side, thus narrowing the ship-passage to 1 or 2 cables only. There is fine anchorage in the interior, in 17 to 20 fathoms, sandy bottom, mixed with mud and clay, and free from rocks in the centre, though they are found near the barrier reef. The W. extreme of this Atoll bears W. by S., 10 m. from Goidu Island.

MAHLOS MAHDU ATOLL. This W. Atoll, upwards of 50 m. in meridional length, is distinctly cut into two parts by a narrow, deep passage, called by the surveyors **Moresby Channel**; thus two groups are formed, which have been called N. and S. Mahlos Mahdu. The S. end of S. group bordering on Cardiva Channel, is available for ships to anchor who wish to obtain a few supplies and wood and water, which are to be had at He-tah-du Island, only 7 m. to the N. of Goidu Atoll. But it would be impossible for ships to navigate with safety through the centre of the N. group, it is so full of coral patches and rocks, called by natives the *jungle*. However, the Moresby Channel may be adopted by any vessel who through error in reckoning gets entangled in these groups.

S. Mahlos Mahdu. Its S.E. side is tolerably straight, and faces Cardiva Channel; its E. point is prominent, and in the same latitude as the S. point of Phaidi-pholo Atoll, which is nearly 20 m. distant. From the E. to the S.W. point of this group the length is 26 m., and most of the islands border this S.E. face. At the extreme S., opening into Goidu Channel, is a good entrance into the Atoll, by which a vessel from the W. may obtain access to anchorage on the N. of **He-tah-du Island** (marking the S. point of the group), in lat. $5^{\circ} 1' N.$, lon. $72^{\circ} 50' E.$, containing 250 inhabitants; wood and water procurable. There are passages on both sides of He-tah-du and its adjoining islands, as well as between all the islands and reefs along the S.E. and N.E. boundaries. The Atoll-wari, or chief man of the S. group, resides at Dhur-an-du Island, containing 100 inhabitants and good water on the boundary, situated 6 or 7 m. to S. of the E. point. The W. side of this group is composed of large separate lagoon reefs with scarcely any islands to distinguish them, but passages into the Atoll are found between them all. The **W. entrance of Moresby Channel** is difficult to make out, being less than 3 m. wide, having no tree-islands, but only barrier reefs. Another deep but very narrow gut leads on about an E. course through the Atoll to S. of Moresby Channel, having a common entrance with it on the W. But vessels had better avoid making either of these from the W.

N. Mahlos Mahdu is of different shape from the S. group, being 35 m. in N. and S. length, and only 15 m. in its broadest part; but its character is similar, having its W. side composed of a series of round or oval lagoon reefs irregularly placed, some prominent, others retiring (a peculiar feature of all these N. Atolls), whilst the E. side is a gentle curve with a series of islands, twenty in number, between all which there are good passages leading into the Atoll. None of these islands have good water, except **Fainu**, in lat. $5^{\circ} 27' N.$, the second N. from Moresby Channel, where the collector of revenue, the chief of Atoll, resides. The lagoon reefs along the W. boundary have little to point them out, and had better be avoided, especially as no vessel could navigate through the intricacy of the Atoll's centre; but its N. end is narrow and clear of reefs, and may be navigated through with ease: the general depths are from 23 to 27 fathoms, water. The N. part of this group has a broad passage between two reefs, with plenty of ground on which vessels might anchor, then a bottomless channel between these reefs and **Powell Islands** (the N. end), in lat. $5^{\circ} 59' N.$, lon. $72^{\circ} 54' E.$, two inhabited islands standing on a detached reef of their own, with no soundings off it, which may be said to mark the N. extremity of the whole Mahlos Mahdu group.

PHAIDI PHOLO ATOLL lies to N. of Cardiva Island and E. of Mahlos Mahdu. It is of a square shape, with its N.E. and S.W. sides pressed in, and the others rather convex; thus it presents four prominent corners, at the S. one of which stands **Aligow Island**, being 16 m. N. by E. of Cardiva; and at the W. corner is **Kani-foori Island**, in lat. $5^{\circ} 20' N.$, bearing N.E. 10 m. from the E. point of S. Mahlos Mahdu. **Aligow Island** has high trees, and thus well marks the W. extreme of the long barrier reef that forms (without any opening) the entire S.E. face of Atoll.

A broad opening is found to the N. of Aligow, and along this concave S.W. side there are several other good passages between islands. The N.W. islands can furnish good water and some supplies. The Atoll-wari resides at **Nah-fori**, in lat. $5^{\circ} 26' N.$, one of the most thickly inhabited islands, situated at one-third of the way from the W. to the N. point of Atoll. Passages into the interior occur between all these N.W. islands; that between the two N. islands is more than $\frac{1}{2}$ m. broad, with 17 and 20 fathoms, water, but some reefs will be found inside. Along the N.E. concave face only two or three openings are found, and these are in the N. half; thence nothing but unbroken barrier reef extends to the E. extreme, and round to **Aligow Island** (with high trees), in lat. $5^{\circ} 15' N.$, lon. $73^{\circ} 29' E.$, the S. point of the group. In the N.E. monsoon, the sea breaks with violence along this extensive barrier reef, 18 m. in length and with several islands; at L. W. large masses of coral rock and some sand-banks are observed along its sea-face. Within this Atoll many coral patches, dry at low tide, and several sunken reefs are found, with 1 or 2 fathoms, water, on them; the general depths on a sandy bottom are from 25 to 30 fathoms. There are upwards of twenty islands, but only four inhabited in this Atoll, and they contain 550 people; several of the others have been inhabited, but, according to native information, the population had died off or had deserted the islands. The tides and currents run strong through the openings into the Atoll.

MILLA-DU MADU ATOLL lies to N.E. of Mahlos Mahdu, being separated from it by a channel only 7 m. broad, and its S. islands bear N.W., 10 m. from the N. islands of Phaidi-Pholo. This Atoll contains 101 islands, extended over a space 55 m. in length in a N.W. and S.E. direction, by not quite 20 in breadth; twenty-nine of them are inhabited, containing a population of 1,700 or 1,800. The islands are principally along the E. frontier, and in the S.E. part of Atoll. The officers who surveyed these islands report that cotton is grown in small quantity on some islands of this group, and it is reasonable to suppose that others of the Maldivhs might produce the same with a little trouble. Ships can easily pass through this group in the day time, as the interior has few reefs, especially in the N. portion; the general depths are from 20 to 25 fathoms, sandy bottom, with clay at times. The tides are felt in the Atoll, running about $1\frac{1}{2}$ to 2 m. an hour at the springs; the flood to E.N.E., the ebb to W.S.W.; the currents influence the tides much. The islands and lagoon reefs which form the boundary of this Atoll are more separated than in the groups previously described, thus leaving broader passages into the interior. There are not many islands along the W. frontier but more lagoon reefs, not in one connected barrier, but in detached portions; on some are small islands, and between the whole there are safe passages. The principal islands are **Man-ah-du** and **Kain-de-co-lu**, both near the E. boundary, the former about 8 m. from the Atoll's S. end, the latter about 10 m. N. of the former. **Karn-dhu-du**, the S. island of this group, is in lat. $5^{\circ} 39' N.$, lon. $73^{\circ} 17' E.$

Anchorage can be had at **Man-ah-du** (the N. end), in lat. $5^{\circ} 47' N.$, either on its N. or S. sides, according to the season; it is a beautiful island, filled with groves of bread-fruit trees and other luxuriant foliage; it contains 100 inhabitants, whose village is on the N. side of island, but good landing-places are found on both N. and S., and a fine pathway through the island. The Atoll-wari resides at **Man-ah-du**. Good water and some supplies may be obtained; the natives keep their boats inside the reef on the N.E. side of island. There is good anchorage also to the W. of **Kain-de-co-lu**, in lat. $5^{\circ} 56' N.$, near its S. point, where good water may be obtained from the village: the passage into the Atoll round the S. side of this island is broad and safe.

Malcolm Atoll, a large lagoon reef, 15 m. long and only 3 broad, lies about 10 m. to W. of the N.W. part of Milla-du Madu group. It was unknown to Europeans previous to the survey of the Maldivhs in 1834-36; but, according to native information, many ships have been totally wrecked on its barren reef, and all lives lost, scarcely a vestige of the wreck being left after a few hours, from the violence of the surf, and the perpendicular sides of the reef. The lagoon is deep, but full of coral patches, and has two passages into it along the E. barrier, but only fit for boats. The N.E. point of this little Atoll is well marked by **Mah-kundu Island**, in lat. $6^{\circ} 25' N.$, lon. $72^{\circ} 41' E.$, containing 100 inhabitants and good water. The N.W. projection has also a small island, but the remainder of the W. side and the S. have nothing to point them out but the surf. The S. end of this reef bears N.W. 24 m. from Powell Islands.

TILLA-DU-MATI ATOLL is on the same plateau of soundings as Milla-du-Madu, and the frontier islands of both are visible one from the other; this Atoll is indeed a continuation of the other, and it is not known why the natives give them two names. From its junction with Milla-du-Madu this Atoll takes a N.N.E. direction for 30 m. There are nearly forty islands in this group, generally of a large size, and some distance apart; those at the N. and E. extremes are largest and inhabited, affording good water and some supplies. Safe passages occur between them all. **Koolah**, the N. island, in lat. $6^{\circ} 59' N.$, lon. $73^{\circ} 12' E.$, forms a very prominent point to the Atoll; it is low, like all the rest, but covered with cocoa-nut trees, visible 15 m. from mast-head. The

W. boundary has not so many islands, but more reefs, between all which there are safe passages, should a vessel be drifted near them, but they had better be avoided.

Gulandu Channel, between Tilla-du Mati and Hea-wandu Pholo Atolls, is at its W., the narrowest part, less than 3 m. broad, but its E. mouth is wide. No bottom could be found with 220 fathoms of line; but should a vessel be drifted into it, she will find passages into the Atolls on either side, where she may anchor. The ebb-tide runs W.S.W., and flood E.N.E.; H. W. at 9 h. 30 m. on F. and C.; rise and fall 5 ft.

HEA-WANDU PHOLO ATOLL, the most N. one of the Maldivh group, lies off the N.W. side of Tilla-du Mati, being separated from it by Gulandu Channel. In extent N.W. and S.E. it is 12 m.; crosswise it measures 7 m. It has twenty-four islands, three or four of which are large; they lie on all sides of the boundary, but the principal ones are at the S.W. and N.E. sides; seven only are inhabited, containing a population of 760 souls; they afford wood, water, and some supplies. There are three small islands in the centre of this Atoll, abounding with fine green turtle, seldom disturbed by the natives, who do not eat them. The general soundings in the centre are 20 to 30 fathoms, but several small patches are scattered about. **Hea-wandu**, near the Atoll's S. end, is the principal island, being the residence of the Sultan's Wazir; it contains 150 inhabitants, good water, and some supplies. It is of triangular form, nearly 1 m. in greatest length; the margin is composed of coral thrown up some 12 ft. above the sea-level. The W. side of the island is thickly planted with cocoa-nut and bread-fruit trees; the N. and E. sides have a thick brush-wood; but the interior, which is 3 or 4 ft. lower than the sides, has been cleared for the cultivation of a small grain called *bimbi*, which, with a few sweet potatoes, pumpkins and limes, and the cocoa-nut and bread-fruit, are the only vegetable productions; rice is imported from India, but only the richer inhabitants can afford it; the boneeto fish, caught in great quantities, is the principal article of food. Fowls are abundant on all islands, but not easily procured, being so wild and difficult to catch. Money will not fetch its full value, as the natives have so little use for it; rice, tobacco, and betel-nuts are the best medium of barter.

Openings. One long barrier reef forms the W. side of Atoll; on this the ship *Vicissitude* (from Mauritius to Ceylon) was wrecked in 1886, during the night, with W. winds. Its S. extreme is a barrier reef, called **Dhig-fur**, the S. part of which is in lat. $6^{\circ} 55' N.$, lon. $72^{\circ} 55' E.$ Between the two reefs there is an excellent passage with 12 fathoms, water, opposite which, at the distance of 1 m. within the line of boundary, stands the Island **Hea-wandu**. Along the E. margin of the Atoll there are nine islands; the S. one marks the E. extreme of the S., or Dhig-fur barrier reef, and a good channel, $1\frac{1}{4}$ m. wide, lies between it and Gulandu to the N.N.E. Between all the other islands (except the two large E. ones, Gamatacan and Mura-du, which are connected by a reef), there are passages for ships, but that between Gulandu and Mura-du has two shoal coral patches, with only a few feet water on them, equidistant from island and shoal, and so making three passages out of the broad space of 3 m. between those islands.

Turacoon, the N. island of all the Maldivh group, is in lat. $7^{\circ} 7' N.$, lon. $72^{\circ} 53' E.$

Anchorage. Vessels bound to Hea-wandu from the E., had better avoid the above shoals, by passing close to Gulandu Island on either side. In coming from the W., Hea-wandu will appear as the S. tree island of the Atoll, and may be steered for when bearing E.N.E. In the S.W. monsoon, a ship could anchor between the E. side of Hea-wandu and a small reef, dry at L. W. at $\frac{1}{4}$ m. off shore. In the N.E. monsoon, the best anchorage is off the S.W. side of the island, in 16 and 17 fathoms, water, to the N. of the barrier reef which bounds the Atoll's S. point.

TIDES. At the head of the Maldivhs, the tides are extremely irregular, and at all times influenced by the prevailing winds and currents; thus in the N.E. monsoon the ebb-stream seems to run longer than in the opposite season. During strong W. breezes the flood sets to the E. for the greater part of the day; but when the wind moderates, the ebb takes its turn and sets W. in like manner, the water falling half a foot lower than it ordinarily does at springs. The rise and fall is about 5 ft., and the streams run about $1\frac{1}{4}$ m. an hour. H. W. on F. and C. of moon, at 9 h. 30 m.

Currents. The currents, about the N. part of the Maldivh chain, set to W. from Dec. to April, inclusive; from May to Aug. they set to E.; about mid-Sept. they turn to S., and continue so till the squally period in Dec., which ushers in the N.E. monsoon.

CHANNELS BETWEEN MALDIVHS AND LAKADIVHS.

The Eight-Degrees Channel. This space of sea, 70 m. in width, between the head of the Maldivhs and Minikoi Island is perfectly safe, and adopted by vessels bound to the Malabar coast or Colombo during the S.W. monsoon, and bound to Bombay or more N. ports at the close of that monsoon in Nov., when the N.-Westers of the Malabar coast are over, and its land-winds are pretty well established. It will be prudent to keep nearer to Minikoi than to the Maldivhs, as the current sets to the S. between end of Sept. and the close of year. In the strength of the S.W. monsoon, mid-channel is the best track, or rather inclining towards the Maldivhs. The currents in this channel are much the same as at the head of the Maldivhs, but in the N.E. monsoon they at times set to N.W. and to N. when Southerly winds occur, but very rarely.

MINIKOI ISLAND, or Malikoi, though generally spoken of as one of the Lakadivh group, is upwards of 100 m. from them, and 68 m. to N. of the Maldivhs. It is very populous, and the natives are hospitable, being under the jurisdiction of the British authorities in Malabar. The erection of a light-house* on Minikoi is in contemplation, as the Island lies right in the track of mail steamers from Point de Galle to Aden. The fine P. and O. steamer *Colombo*, was stranded there during a fog, in Nov., 1862. To give a general notion of the relative position of Minikoi to the Malabar coast, it may be stated as being nearly in the latitude of Cape Comorin, from which it is distant 270 m.

The extremes of Minikoi Reefs lie between lat. $8^{\circ} 14'$ and $8^{\circ} 19' N.$, and between lon. $72^{\circ} 59'$ and $73^{\circ} 5' E.$; the island being at the S.E. half of this space.

The Island is a narrow strip of low land, 7 m. long, lying N.E. and S.W., and an irregular coral reef projects from its N.W. face about 3 m., and joined to the extremes of the Island; but on the S.E. side there is no reef. On the reef near the W. point of the Island there is a small islet with trees, in lat. $8^{\circ} 18' N.$, lon. $73^{\circ} 0' E.$ At the N. end there is a passage through the reef, with a greatest depth of 2 fathoms, through which boats and small vessels pass, but it is narrow and intricate. Where the boats lie inside the reef the water is deeper, $2\frac{1}{2}$ and 3 fathoms, over a bottom of hard coral. The Island is well planted with cocoa-nut trees, about 70 ft. high, and visible from a vessel's deck 10 or 12 m.

The Nine-Degrees Channel, bounded on the S. by Minikoi and to the N. by Seuheli-par and Kalpeni Islands, has a width of 108 m. It is used, as the Eight-Degrees Channel, at the close of the S.W. monsoon, by vessels bound to Bombay; or in the strength of the S.W. monsoon, by vessels bound to Cochín, Tuticorin, or Ceylon, when the route either N. or S. of Minikoi may be adopted at discretion.

If bound from Mozambique Channel to the S. part of Malabar coast, or to Colombo, near the close of the S.W. monsoon, a course may be steered from the equator to N. of the Seychelles, about lon. 53° or $54^{\circ} E.$, to pass through the Eight or Nine Degrees Channel; but if bound to the S. part of Ceylon or the Bay of Bengal, the One-and-a-Half Degree Channel seems preferable, being more direct and equally safe as the former. This latter channel, however, should not be used, nor any of the channels to the S. of it, during the strength of the S.W. monsoon, but either the Eight or Nine Degrees Channel may then be adopted at discretion; if the wind is steady at S.W., the Eight Degrees Channel may be followed, as it is rather more direct than that to the N. of Minicoy. If this channel is taken when bound to the Bay of Bengal, and certain of being to the E. of Minicoy, a direct course may be steered for Point de Galle.

In passing through the Nine Degrees Channel in thick weather, and uncertain of the latitude, if Minicoy Island is seen, pass on either side; but great caution is requisite in approaching any of these islands in thick weather, or in light winds, for they are all very low, with extensive coral reefs around them, close to which there are no soundings. The current frequently sets to the S. amongst them in both monsoons; there is a set sometimes to the N., when the winds are light or variable, in the N.E. monsoon.

* The light-house on Minikoi has been *proposed* for so many years in the Admiralty list of lights, that we hope to hear soon of its erection.

LAKADIVH ISLANDS AND BANKS.

The Lakadivh Islands,* or Lakra-divh group, consist of about a dozen small islands, with a few detached reefs and banks; they stand on the verge of steep, coral reefs, close to which no soundings are obtainable, therefore great caution is requisite in approaching any of them in thick weather or in light winds. Being all so low, with cocoa-nut trees only 50 or 60 ft. above the sea, these Islands are not discernible at any distance, and therefore are commonly and prudently avoided by navigators; but amongst them there are safe and wide channels through which a ship may extricate herself if, by any error in reckoning or otherwise, she gets amongst them. The group belongs partly to the British Government, being subordinate to Calicut; partly to the Bibi of Cannanore, with which place these islanders have their principal trade.

SEUHeli-PAR, the S.W. danger of the Lakadivh group, is a reef with two islands, small and low, each less than 2 m. in circumference, the one bearing N.N.E. $\frac{1}{4}$ E. from the other, distant 6 m. The N. island, in lat. $10^{\circ} 6' N.$, lon. $72^{\circ} 14' E.$, stands at the extreme N.E. margin of the reef, which dries at L. W., and hence extends to S.W. for 11 m.; at about 3 m. to W.S.W. of that island, there appears to be an opening into the lagoon. A coral bank of soundings, with 4 and 5 to 9 and 11 fathoms, water, projects about 1 m. to N. of the N. island, and thereabouts appears a passage into the interior, through which boats can proceed to the S. island, which stands more than 1 m. within the S.E. boundary of Seuheli-par Reef. The islands are well wooded, but not inhabited, except when boats come from other Lakadivh islands in the fair season to fish. The water procured by digging is salt and unfit to use; a soft kind of wood, which will do for fuel, may be got on the N. island, but the other abounds most with cocoa-palms, the nuts of which are unpalatable.

The S. island is in lat. $10^{\circ} 0' N.$, and lon. $72^{\circ} 12' E.$, and the reef extends rather more than 5 m. S.W. by W. from it.

Caution. The Seuheli-par Reef, being deep-to, should be approached with great caution; many of the black rocks on it are considerably elevated above L. W. mark, but at high tide its boundary is nearly all submerged. The account given by the officers of the ship *Anne* (from the Red Sea), wrecked about midnight of April 9th, 1804, makes another reef to lie several miles on a N.W. bearing from the Seuheli-par Islands; but Captain Moresby could discover no appearance of danger about the situation assigned to *Anne's* Reef, which was probably the edge of the great reef, the estimated distance from the islands having been overrated at the time of the misfortune.

KALPENI, (the S. end) in lat. $10^{\circ} 3' N.$, lon. $73^{\circ} 35' E.$, the S.E. island of the Lakadivhs, bearing nearly E. 79 m. from Seuheli-par, is composed of two narrow, low islands, standing on the E. side of a lagoon reef, nearly 7 m. long N. and S., and about half as broad. The S. or largest island (Kalpeni), which is inhabited and well planted with cocoa-nut trees, has soundings of 9 or 10 fathoms, coral bottom, off its S. end; from this the barrier reef extends round the W. and N., and joins the N. end of the N. island (Cheria). This reef is deep-to, with high breakers, and no soundings obtainable till close to the surge; through one part of it there is a narrow passage into the lagoon, with only $1\frac{1}{2}$ and 2 fathoms, water, but from 3 to 4 fathoms are found on the coral flat inside. The boats of the natives lie at the S.W. part of Kalpeni, on a nearly S. bearing, and about 3 m. distant from the gateway or passage through the reef.

Underoo Island, or Anderoot, (the E. end) in lat. $10^{\circ} 47' N.$, lon. $73^{\circ} 42' E.$, bears N. $\frac{1}{4}$ E. 38 m. from the N. end of Cheria, and the channel between them is clear of danger. This island, $3\frac{1}{2}$ m. long, E. and W., and less than half as broad, is low and well planted with cocoa-nut trees; it is defended by a wall of coral rocks all round, through which there is only one small passage for boats. The S. side is very deep-to, and affords no anchoring-ground, but vessels can anchor off the E. point, in 10 or 12 fathoms, sand and rock; and on the N.E. and the N. an extensive coral bank projects some 6 or 8 m., with various depths from 8 or 10 fathoms to 16 fathoms. About a mile from the island, the bottom on this bank of soundings is sandy in 10 or 12 fathoms, where vessels might anchor during S. winds abreast the houses scattered along the N. side of Underoo. In the N.E. monsoon, vessels can anchor in 10 or 12 fathoms, about $\frac{1}{4}$ m. from shore, with extremes of island bearing from N.N.E. to E. by S. Turtle may be got here; water is tolerably good; the natives are poor and inoffensive. Underoo is the nearest island to the Malabar coast; Mount Dolly bears from it N.E. $\frac{1}{4}$ E., and is distant 113 m. (See page 402.)

ELICALPENI BANK, of circular form, nearly 5 m. in diameter, bears N.E. by N. from

* These islands are under the British Collectorate of Calicut. (See page 404). Some cyclones, travelling up the Malabar coast (notably the *Cleopatra's* storm, of April, 1847), for a time submerged some of these islands, destroying more than 1,000 people.

Underoo, 28 m. Its centre is in lat. $11^{\circ} 13' N.$, and lon. $73^{\circ} 57' E.$, or about the latitude of Calicut, from which place it is distant 100 m., but only 83 m. on a S.W. by W. bearing from Mount Delly. It is composed of sharp coral rocks; the least water found during an examination of two days with three vessels, was 6 fathoms, but it ought to be avoided by large ships, particularly in the S.W. monsoon, when the high sea might cause a vessel to bump. The barque *Premier* had soundings on it, varying from 9 to 4 fathoms, in about lat. $11^{\circ} 15' N.$; therefore it may probably extend more to N., or have a less depth than shown on charts.

CABRUTI, or COORUTI ISLAND, (centre) in lat. $10^{\circ} 31' N.$, lon. $72^{\circ} 38' E.$, bears N.E. $\frac{1}{2}$ N., and 32 m. from the N. Seuheli-par Island, and W.N.W. 62 m. from Kalpeni; the channel between them being (so far as known) clear of dangers. Cabruti is a low island, nearly 3 m. in length, N.E. and S.W., by 1 m. in breadth; trees are visible from a ship's deck, about 10 or 12 m. Although not large, this island is valuable to the natives, by affording good water, and two species of excellent cocoa-nuts. A steep coral reef encompasses the S. and W. sides of island (forming a lagoon within), projecting out for 2 m. in some parts; the E. side is also steep and rocky. The proper entrance to the lagoon is at the N.E. end of island, but the boats of natives pass through other parts of the reef. Off the reef, at the S.W. end of island, there is a coral spot, where a vessel might anchor in necessity, with a chain cable. The tides or currents run here at times 2 m. an hour; never setting upon any of the islands, but generally along them, or along the reefs, thus lessening the danger to be apprehended in calms. The flood sets to N.E. and ebb to S.W.; the former is nearly nullified by current in the N.E. monsoon, as among the Maldivhs.

Piti Sand-Bank, in lat. $10^{\circ} 45' N.$, lon. $72^{\circ} 32' E.$, is about 6 ft. above sea, without shrubs or verdure, bearing N.N.W. 15 m. from the N. end of Cabruti, and about S.S.W. from Ameni. This sandy isle or bank is small, and probably the sea makes a clear breach over it in the S.W. monsoon. It is generally covered with birds, and on its E. side there is a black rock resembling a wreck. To the E. and S. of it, there are soundings of 6 and 4 fathoms, a part of the rocky bank of soundings which projects 9 m. to the N.W. towards Tingaro, and about 20 m. to N.N.E. towards Ameni; indeed, the chart makes it join the plateau on which that island stands. From Ameni, the E. side of this bank runs down S. by W. for 10 m., then nearly S. for a like distance, on the meridian of Cabruti till a mile or two below the latitude of Piti Sand. More ancient accounts make it extend some 9 m. E.S.E. from Piti. The soundings range from 6 to 20 fathoms, the smallest depths being near Piti, and at 6 to 8 m. from Ameni.

AMENI (centre), in lat. $11^{\circ} 5' N.$, and lon. $72^{\circ} 41' E.$, is a nearly round island, about $1\frac{1}{2}$ m. in diameter, and surrounded by rocks; close to those on the S. side there are soundings of 8 and 10 fathoms, where a vessel can anchor in the N.E. monsoon; between these soundings and the N.E. extremity of the bank extending from Piti, there appears to be a narrow gap of deep water; this is uncertain, for a depth of 14 fathoms was found at $3\frac{1}{2}$ m. distance on a W. course from where the E. I. C. surveying brig *Taptes* was anchored in 8 fathoms to S. of Ameni, with extremes of the island bearing between N.N.E. and W.N.W.; and intermediate casts of 10 fathoms, water, were found.*

Cardamum (centre), in lat. $11^{\circ} 13' N.$, lon. $72^{\circ} 44' E.$, is a long, low island, 5 m. N.N.E. from Ameni, and its greatest length is 4 m., N.N.E. and S.S.W. On its W. side a coral reef stretches out nearly 2 m., embracing both ends of the island, but extending more from the S. end than from the N. Near the S. point of the reef there are said to be soundings of 16 and 20 fathoms, nearly half-way towards Ameni, but these are not on the chart.

AUCUTTA ISLAND bears N.W. $\frac{1}{4}$ W. 32 m. from Cabruti, which it much resembles in size. It is well inhabited, planted with cocoa-nut trees, and seems a little higher than the small islands in its vicinity. At 1 m. from its S.W. point, and joined to it by a reef, is little **Calputi Island**, with soundings off its S. side, in lat. $10^{\circ} 49' N.$, and lon. $72^{\circ} 9' E.$, and the N.E. point of Aucutta bears from it N.E. by N. 4 m. Both islands are on the same coral reef, which projects more than a mile W. of Calputi, and nearly 2 m. W. of Aucutta. From Calputi, the Piti Sand bears E. by S. 23 m. To the N. and the N.E. of Aucutta there is an extensive plateau of soundings connecting it with Bingaro and Tingaro Islands, and a vessel could anchor in the N.E. monsoon in 7 or 8 fathoms about $1\frac{1}{2}$ m. off the S.W. side of Bingaro.

Bingaro and Tingaro are two small islands encircled by a coral reef, which projects about 2 m. to N.W. and to W. and S. of the former island, with 1 m. round Tingaro, the E. side of which is deep-to. The chart exhibits a fine bank of soundings extending from 1 m. to 4 m. to W. of Bingaro Island, and down to Aucutta as mentioned before; this bank has soundings on it, from 6 to 7 fathoms near Bingaro to 10 to 15 fathoms near Aucutta, and ships might occasionally anchor

* The islanders reported a shoal bank to lie 10 m. N.W. from Ameni, but a fruitless search for it was made by the *Taptes*. Navigators must remember that the vicinity of these islands has been only partially explored.

on it with a chain. Tingaro lies about 2 m. E.N.E. from Bingaro, and is in lat. $10^{\circ} 56' N.$; from it the nearest part of the bank of soundings (that extends several miles N. of Piti) bears about E.S.E. 9 m.

PEREMUL-PAR is a triangular reef pointing to S., to N.W., and to N.E.; near the latter point there is a small, low isle or sand-bank, in lat. $11^{\circ} 9' N.$, lon. $71^{\circ} 59' E.$, within the reef at about 3 m. from the N.E. tip. The S. point of this reef bears N.W. 18 m. from the centre of Aucutta Island; there are soundings close to the reef on the S.W. side and round the N.W. point or angle.

Betra-par (the N.W. one of those reefs which have *tree-islands*), bears N.N.E. from Peremul-par Sand-Bank, the channel between them being 18 m. broad. The island Betra-par, lying at the N. extremity of the reef, is small and low with some trees on the N. part, in lat. $11^{\circ} 35' N.$, and lon. $72^{\circ} 9' E.$ Close under its S. side there is a gap in the reef, with 2 fathoms, water, where in fine weather a small vessel might lie for a short time; and a ship may anchor during N.W. winds in 6 or 7 fathoms, water, very close to the reef with the centre of Betra-par Island bearing N.N.W. distant about 1 m. There is a little sandy isle near the E. face of the reef at 4 m. to the S. of the tree-island, and the reef extends 2 or 3 m. more to S. Both S. and W. sides of this reef seem to be less wall-like than those of the Maldivhs, for a depth of 12 fathoms is shown on the chart off its S. extreme, and the ship *Grantham*, which ran on to the W. part of this reef, Oct. 8th, 1713, succeeded in heaving off by a kedge laid out in deep water.

KILTAN ISLAND (the N. end), in lat. $11^{\circ} 30' N.$, lon. $72^{\circ} 59' E.$, bearing E. from the S. extreme of Betra-par Reef, and N.E. 19 m. from the N. end of Cardamum, is $2\frac{1}{2}$ m. long N.N.W. and S.S.E. The island, inhabited, and well covered with trees, is quite steep-to along its E. face; but its W. side has a fringing reef, which extends about $\frac{1}{2}$ m. off, and beyond that a narrow bank of soundings, which off the S. end of the island extends no more than 1 m., but affords anchoring-ground in 5 or 6 fathoms, water, about 3 cables' lengths off shore. The best anchorage for communicating in fine weather with the shore is off N.W. point of Kiltan, in 7 or 8 fathoms, only about 3 cables' lengths from shore. This position is abreast of the landing-place, within the fringing reef, which has but a narrow passage for boats.

CHITLAC, the N. island of the Lakadivhs, in lat. $11^{\circ} 41' N.$, and lon. $72^{\circ} 42' E.$, bears from Kiltan N.W. by W. 20 m., and E. by N. from the N. end of Betra-par, from which it is 32 m. distant. It is about $1\frac{1}{2}$ m. long N. and S., its E. face steep-to, but a coral reef stretches round its W. side, having a narrow bank of soundings outside, which extends to N. and S. of the island, affording anchorage in fine weather. The island is well planted with trees, and inhabited; the water is pretty good, and excellent poultry, though in small quantity, may be procured.

The best anchorage in the N.E. monsoon is off the S. end, in 8 or 10 fathoms, water, with the extremes of the island bearing between N. and N.E. by N., and the W. extreme of the barrier reef N.N.W.; this position is only about 4 cables' lengths from the island. It is best to employ a native boat in communicating with the shore. Chitlac and Kiltan belong to the British Government, whose representatives are a few peons from Calicut.

Byramgore Reef, or Chereapani, is 10 m. long N.W. and S.E., but including the bank of soundings off its N. end, the extreme length is more than 12 m., and its breadth 5 m. The S.E. point of the reef, which dries at L. W., is in lat. $11^{\circ} 48' N.$, and lon. $71^{\circ} 50' E.$, bearing N.W. by W. 24 m. from Betra-par Island, and the channel between is safe. There is a narrow bank of soundings off the E., the S., and the W. sides of this reef, but that on the N. is 3 m. broad, with overfalls of 6, 4, and 8 fathoms, water; but there may be a less depth, for it is studded with coral rocks, which are plainly visible under a vessel's bottom. The coral rocks fringing the reef are discernible at L. W.; but, as this and Beleapani Reef are so deep-to, the approach at night is very dangerous, as the noise of surf would not be heard unless a ship were to leeward in calm weather; and the current frequently sets 12 or 15 m. during night in uncertain directions, especially in unsettled weather at the change of monsoons, although usually between S.E. and S.W. during Feb., March, and April. The ship *Byramgore* was totally lost on the S. end of this reef on Nov. 17th, 1827, and it is believed that this is the reef on which the ship *Competitor* struck in the night of Aug. 21st, 1827, but fortunately backed off and reached Bombay.

CHERBANIANI REEF, or BELEAPANI, the N.-most dangerous reef of the Lakadivhs, is a long, oval reef, 7 m. in length N. and S., and its S. end bears N.N.E. from the N. end of Byramgore Bank, leaving a fair channel of 18 m. between them. There are sand-banks on the N. and E. sides; by the latter there is a passage into the interior for boats. At the S. end there are a few coral rocks, which seem always to be above water, but the greater part of the boundary reef is only visible towards L. W. The E., the N., and the N.W. sides, are as steep as a wall, but off the S. and S.W. sides a bank of soundings extends nearly a mile, and on this vessels can anchor

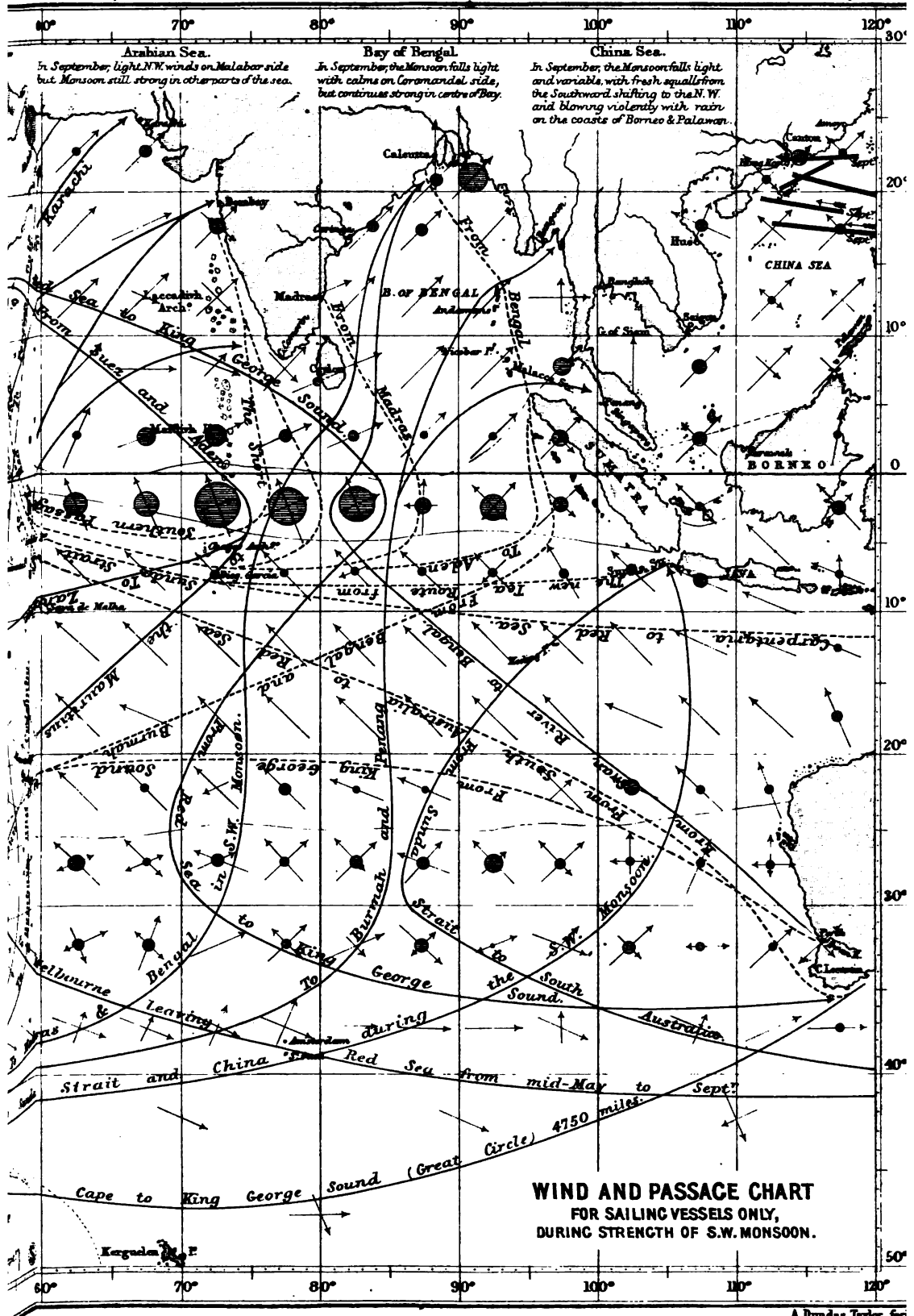
in the N.E. monsoon, in 9 or 10 fathoms, water. The extent of the reef is from lat. $12^{\circ} 17'$ to $12^{\circ} 24'$ N, and its S. point is in lon. $71^{\circ} 52'$ E.

Tides. At Cherbaniani and Byramgore Reefs, as well as at Kiltan and Chitlac, the spring-tides rise 6 or 7 ft., and neaps 8 ft.; the flood sets to N.E. and ebb to S.W. The ebb-stream runs strongest and longest, for 8 to 10 hours together at springs, during N.E. monsoon, when the drain of current runs with it; at that season the flood-stream is scarcely perceptible, although the regular rise of tide is visible on the reef. High water occurs at 10 h. 30 m. at F. and C. of moon.

Bassas de Pedro, or Padua Bank, called Munyal-par by the Lakadivh islanders, is a large bank of soundings of crescent form, concave to the E., ranging over a space 70 m. in length by 10 to 15 m. in breadth, or between lat. $12^{\circ} 30'$ and $13^{\circ} 40'$ N., and between the meridians of $72^{\circ} 15'$ and $72^{\circ} 45'$ E., having on the N. part soundings from 22 to 28 fathoms, and on the S. part 26 to 34 fathoms, sand, shells, and rotten coral; the water on the bank is not discoloured, so as to indicate soundings, and the edges of it are steep-to. **Sesostria Bank**, discovered by the E. I. C. steam-frigate *Sesostria* in 1847, lies about 15 m. to W. of Munyal-par, between the parallels of $13^{\circ} 0'$ N. and $13^{\circ} 15'$ N., and between the meridians of $71^{\circ} 52'$ E. and $72^{\circ} 5'$ E. The general soundings on it are from 18 to 28 fathoms, but near both N. and S. extremes, casts of 11 and 12 fathoms were found; the sides are steep-to. **Cora-Divh**, formerly called Little Padua Bank, lies to N.N.E. of Sesostria Bank, and to N.W. of Munyal-par, or between lat. $13^{\circ} 34'$ and $13^{\circ} 52'$ N., the centre being in lon. $72^{\circ} 10'$ E. The soundings on this bank range between 24 and 29 fathoms, the bottom sand, decayed coral, and broken shells; its length is 20 m. N.N.E. and S.S.W.; its average breadth 6 m.

Vessels bound to Goa or Port Carwar, in the S.W. monsoon, might sound on these banks to make sure of position in cloudy weather. They seem conveniently placed as *Direction Banks* for Carwar Port (*see* page 397); like as Angria Bank serves for Viziadrug, and the Direction Bank for Bombay.





WIND AND PASSAGE CHART
FOR SAILING VESSELS ONLY,
DURING STRENGTH OF S.W. MONSOON.

CHAPTER XIX.

KEELING ISLANDS—SUMATRA WEST COAST.

KEELINGS OR COCOS—ISLANDS OFF ACHEEN HEAD—PEDIR COAST—WINDS AND CURRENTS OFF ACHEEN HEAD—PEPPER PORTS—DIAH—TELLOO CROOET—TELLOO GOOLUMPUNG—PALO RANGAS—RIGAS HARBOUR—BANCOONGONG TO PADANG—PADANG TO FORT MALBOROUGH—BENCOCLEN—ISLANDS OFF SUMATRA W. COAST—HOG ISLAND—PULO NIAS—THE PAGER ISLANDS—ENGANO—SUNDA STRAIT—JAVA W. END—BATAVIA—CHRISTMAS ISLAND.

(VARIATION AT KEELINGS, 1° W.; AT ACHEEN HEAD, $1\frac{1}{2}^{\circ}$ E.; AT ENGANO ISLAND, $0\frac{1}{2}^{\circ}$ E.; AT CHRISTMAS ISLAND, NO VARIATION.)

The Keeling or Cocos Islands are in two distinct divisions, lying N. and S. of each other, having a channel between them about 15 m. wide. The N. division consists of one island only, about $1\frac{1}{2}$ m. long, N. and S., covered with cocoa-nut trees, and surrounding a small interior lagoon. In the S. group the islets are numerous. They were not much known previous to the visit of Captain J. C. Ross, of the ship *Borneo*, who partially refitted his ship at the S. group in 1825, and settled there. He gave this group the name of the *Borneo Coral Isles*, restricting the name of Keeling to the N. island. The harbour, first named Port Refuge, is sometimes called Port Albion. New Selma is the village where he fixed his residence, with his family and followers, amongst whom were a smith and a carpenter. The S. group is a cluster of islets encircling a shallow lagoon, of an oval form, about 9 m. long and 7 wide. The islets are coral reefs, on which broken coral and dust afford place and nourishment for thousands of cocoa-palms. Outer edges of the islands are considerably higher than the inner, but nowhere exceed 20 ft. above mean level of sea. The lagoon is shallow, almost filled with branching corals and coral sand.

The S. Keeling Isles extend from lat. $12^{\circ} 4'$ to $12^{\circ} 18'$ S., being 9 m. in length from N. to S. and about 7 m. in breadth from E. to W.

Ships homeward bound, after clearing Sunda Strait and Java Head, are liable to sustain damage, whilst carrying sale with the S.E. trade-wind against a heavy swell from the S.W.; and as Port Refuge or Albion is situated nearly in the direct route of these, and also of ships outward bound to the W. coast of Sumatra, or the E. parts of the Bay of Bengal, late in the season, the settlement of New Selma is of importance to the commerce of the British Empire, and to general navigation, by affording a harbour of refuge for ships to repair damage, or to refresh their people, if scorbutic, with cocoa-nuts and good water, and hogs and poultry may be procured. New Selma has been found a healthy place: the trade wind blows constantly with more or less strength, varying occasionally between S. and E.N.E.; the showery season is from Jan. to July, but slight showers fall at other times. The current usually sets to the N.W., sometimes from 1 to $1\frac{1}{2}$ m. per hour; and the range of the thermometer is between 73° and 84° .

A ship intending to stop at Port Albion, or Refuge, ought to get into lat. $12^{\circ} 10'$ S., to the E. of the Coral Isles, and proceed to the W. on that parallel until their E. part is seen; then steer for the N.E. island of the chain, called Direction Island, and round it on the N. and W. sides, about $\frac{1}{2}$ m. off, to give a berth to the reef on the N.W. side. The harbour's entrance is $\frac{1}{2}$ channel from Direction towards Horsburgh Isle; then be ready to anchor in from 10 to $4\frac{1}{2}$ fathoms water, when Direction Island bears about E. or E. by N., as the bank of soundings is very steep, there being only 3 fathoms when this island bears about N.E. by E.; a spot of sandy ground ought to be chosen for anchorage, as there are many rocky patches; and afterwards, the ship may be warped into the deep-water basin inside of Direction Island, or piloted up the harbour by an experienced person belonging to the settlement of New Selma, where wood and water may be obtained.

The N. Keeling, in lat. $11^{\circ} 50'$ S., lon. $96^{\circ} 50'$ E., consists of one small island, about a mile in diameter; a strip of low coral land surrounding a small lagoon, and thickly covered with cocoa-nut trees; seen at the distance of about 16 m.; and on a nearer approach a heavy surf breaking upon a low white beach.

Soundings on the seaward side of the islands could seldom be got: but as they were obtained 2 m. N. of the larger island, it may be inferred that the sea is not so deep between the two as it is in other directions. Only a mile from the S. extreme of the S. Keeling, no bottom could be got with more than 1,000 fathoms of line.

Direction Island is in lat. $12^{\circ} 5' S.$, lon. $96^{\circ} 54' E.$ Variation $1^{\circ} W.$ High water on F. and C. at 5h. 30m.; rise 5 ft.; rate of flood-tide into Port Refuge, about $1\frac{1}{2}$ m. per hour. Horsburgh Isle is 2 m. to W. by N. of Direction Island, and Water Island is nearly as far to S. by E. Captain Ross cultivated with success abundance of maize, pumpkins, &c.; poultry is thriving, and numerous. Turtle, at present, are plentiful and easily obtained. On Scott Island, the principal station of the new settlement, fresh water is good and abundant; but this upper part of the harbour is shoal. Some of the islanders being ship-builders and mariners, and a few mechanics, a vessel in distress may be assisted, or hove down, or receive any repairs which are not of great magnitude.

Port Albion, or Port Refuge, has only one entrance for ships, at the N. part of the lagoon, and the navigable channel is only $\frac{1}{2}$ m. wide: this is bounded on the W. side by Horsburgh Island, (the N.-most of the chain) and by Direction Island on the E. side. Straggling rocks, and an extensive reef, called Turk Reef, stretch from Horsburgh Island to the S.E. and South, $1\frac{1}{2}$ m., and to the S.S.W., $3\frac{1}{2}$ m., uniting with Ross Island, which forms the W. side of the harbour, and is 5 m. in length. Scott Island is in the form of a crescent, and lies at the S.E. angle of the harbour, the S. and W. sides of which are bounded by coral reef. From the N. end of Scott Island, the E. side of the harbour is a succession of islets, stretching to Clunie Island, which approaches near to Direction Island, there being only a few islets between them. This coral chain of islands, or *wall*, in mid-ocean, is elevated only from 8 to 10 ft. above the sea, at H.W. spring tides. Most of the isles are covered with cocoa-nut trees, and two other species, one of them soft, white, and spongy; the other heavy, hard, dark-looking timber. The cocoa-nut trees near the sea have a saline taste, and are small; but those in the middle of islands are good. The beaches abound with land crabs, aquatic birds, and turtle.

Soundings will be got suddenly, when on a transit line joining the two islands that form the entrance; and when inside about a mile, having brought the N. extreme of Direction Island to bear about E.N.E., she ought to anchor in 4 or 5 fathoms in the outer anchorage, which is perfectly smooth, and not proceed farther without a pilot. The E. and W. harbours are separated by a large rocky shoal in middle of the port, called Dymoke Shoal, or Middle Ground, having on it from $1\frac{1}{2}$ to $2\frac{1}{2}$ fathoms water. The S. extremity of the port also is very shoal. The outer anchorage is sufficiently capacious to contain a great number of ships, but is in some parts spotted with *mushroom* coral, which may easily be avoided in anchoring, as the water is very clear.

Ships drawing above 18 ft. water should not attempt to sail in over the bar; but if on an emergency they do so, the coral patches may be avoided by a careful person on the fore-yard directing the ship's course. These patches, a darkish colour, are easily discerned at a distance, as the water is extremely clear, and the sandy bottom of snowy whiteness. Ships drawing about 21 or 22 ft. water, intending to go inside, may warp over the bar, and afterwards choose either the E. or W. harbours at discretion. The depths on the bar are 8 to $8\frac{1}{2}$ fathoms, and the best track is a little nearer to the islands on the E. side than mid-channel; the depth increases when over the bar, from 4 to 6 fathoms, avoiding the coral heads in approaching the inner harbour on either side of Dymoke Shoal. New Selma, where Captain Ross resided—now abandoned as being far from the port—is on Scott Island, at the S.E. angle of the harbour, in lat. $12^{\circ} 12' S.$, lon. $96^{\circ} 56' E.$

Water Island, in lat. $12^{\circ} 7' S.$, lon. $96^{\circ} 54' E.$, is the new settlement.

The Keeling Islands seemed placed by nature as a refitting station for outward-bound ships, which pass the Cape of Good Hope from mid-Sept. to end of Dec., on their way to Madras, Calcutta, or Burmah, and to the Malacca or Sunda Straits. It is much to be desired that the settlement may be kept up, and a light-house erected at one point—say, Horsburgh Isle—and a more complete survey made of the bank of soundings off it, and connecting it with the lagoon harbour.

The Wind Charts, of the N.E. monsoon, exhibit cyclone tracks for the months of Dec., Jan., Feb., and March, between Madagascar and the N. coast of Australia. A ship crippled, or even dismasted at that season, between Swan River and the Keelings, might drift easily to these islands to refit herself and refresh her crew.

WEST COAST OF SUMATRA.

ACHEEN AND THE ADJACENT ISLANDS.

Pulo Rondo, in lat. $6^{\circ} 4' N.$, lon. $95^{\circ} 11' E.$, is the N.-most of the islands off Acheen ; which islands are often seen by ships approaching the Malacca Strait, or used as stations of departure in sailing from it, when bound to the W. There is said to be a ledge of rocks about 2 m. to the S. of Pulo Rondo. From the S. end of Great Nicobar it bears S.E. by E. $\frac{1}{2}$ E., distant 84 m., and being a rock of round form, 350 ft. high, may be seen 8 leagues from the deck of a large ship. On the N. side it is steep without soundings, which is the case to E. and to W. ; but to the S., distant from it about 2 m. or more, there are two or three rocky islets, from 50 to 70 ft. above water, betwixt which and the N.W. end of Pulo Way there is a safe channel 4 leagues wide.

Pulo Way, the largest of the Acheen Islands, about 5 leagues to S.E. by S. of Pulo Rondo, extends about 3 leagues to S.E. Being high and uneven, it may be seen 12 leagues ; and along the S. side, in some parts, there are soundings near shore. Captain Miller stood within 2 cables' lengths, and perceived no change in the water from the deep, clear ocean blue, nor could soundings be obtained in stays ; there is a bay of considerable magnitude just to the E. of the S. point, which may afford anchorage. There is a rock above water off the S. point about the size of a boat : it lies above $\frac{1}{2}$ m. off shore. It nearly proved fatal to the *William Wilson*, while beating through that channel in a moonlight night, but may be avoided when aware of its existence.

MALACCA PASSAGE, formed between Pulo Way and the Sumatra coast, is about $2\frac{1}{2}$ leagues broad, with Malora Islet, or **Pulo Buroo**, nearly $\frac{1}{2}$ channel over from Sumatra shore. The passage on either side this island is safe, but between it and Pulo Way the water is deep ; whereas, that inside is 2 m. wide, and has moderate depths for anchoring occasionally, 14 to 16 fathoms near Pulo Buroo, and 9 or 10 fathoms near Sumatra shore, which in passing Point Pedro must not be approached under 10 fathoms. Working through in the night, keep the lead going quickly, standing to 10 fathoms, and not under this depth, towards Point Pedro : the water deepens very quickly from 12 to 17 fathoms in standing towards Buroo, then from 12 to 8 fathoms within $\frac{1}{2}$ m. of it ; but do not go nearer, as a reef projects from the E. side of it more than $\frac{1}{2}$ m. This is the best passage to approach Acheen in coming from the N.E. or the E.

Pulo Brasse is high and even ; fronting the sea to the N.W. The N. end is in lat. $5^{\circ} 45' N.$, lon. $95^{\circ} 7\frac{1}{2}' E.$, bearing from Pulo Rondo about S. by W., distant $6\frac{1}{2}$ leagues. Off the N. end, there are four rocky islets, the N.-most of which is about $3\frac{1}{2}$ m. distant, and about 25 ft. above water, with regular soundings near it, 25 to 28 fathoms, mud, from 1 to 2 m. to the E. and the N. ; but a reef projects from the N. end of Pulo Brasse towards the other islets. The outer islet is bold to approach on the E., the N., and the W. sides, and there is a passage between it and the next islet ; but vessels should pass outside ; on the other islets the sea breaks high in moderate breezes. The two detached rocks off the N. point of Pulo Brasse may by a stranger be mistaken in the night for the two rocky islets lying about $2\frac{1}{2}$ m. off the same point, round which it is necessary to pass as close as possible ; caution is therefore necessary. The current frequently sets very strong round these islands to the W. Along the E. side of Pulo Brasse there are 20 to 25 fathoms, sandy bottom, at a moderate distance from shore, where ships may occasionally anchor.

BENGAL PASSAGE, formed between Pulo Brasse and Pulo Way, is 3 leagues wide, and very convenient for ships sailing from Acheen to the N., as the current generally sets out in that direction ; but those bound into the road seldom proceed through this passage, unless with a steady commanding breeze, there being no anchorage in it except near Pulo Brasse ; the Malacca Passage is thought preferable. Ships, coming from the S.W., sometimes use the Surat Passage, but the Bengal Passage is favourable for ships bound out from Acheen Road to the W., as the current in the S.W. monsoon sets round Pulo Brasse to the W., frequently from 25 to 40 m. in twenty-four hours. (See pages 321 to 327.)

Pulo Nancy nearly joins to the S.E. point of Pulo Brasse : but between them, on the W. side, lies Middle Island, of considerable size, with some islets or rocks near it on the S. side. Near the W. point of Pulo Nancy, 2 m. off shore, there is a reef of rocks, which bounds the W. end of Cedar Passage on the N. side, having 10 and 12 fathoms close to outside, and 14 fathoms betwixt it and the point of Pulo Nancy, although it lies near that point.

CEDAR, or SEDRE PASSAGE, formed between Pulo Nancy to the N., and Stony Island and Pulo Gomez to the S., is little frequented, although wider than the Surat Passage, and safer than generally supposed, there being soundings in it from 17 to 20 fathoms in mid-channel. The

only dangers are at the W. entrance, rocks projecting from Pulo Gomez to the W., on which the sea breaks high in bad weather; and rocks on the N. side close to the W. point of Pulo Nancy, already mentioned; there is also a reef that projects from the W. end of Stony Island to the N.W. If a ship proceed through this passage, it will be prudent to keep a boat ahead, sounding occasionally. On the S. side of Pulo Nancy, a little more than 1 m. inside the W. point, there is good anchorage in 6 or 7 to 10 fathoms in a small bay, on the W. side of which fresh water may be procured, and plenty of fire-wood. The narrowest part of the passage is betwixt the reef projecting from W. end of Stony Island and the shore of Pulo Nancy, and there it is about a mile broad. Stony Island and Pulo Chinchin are steep on the N. sides, having from 11 to 14 fathoms close-to: from the E. point of Pulo Nancy rocks project a little way, and close to them there are 15 fathoms, water.

SURAT PASSAGE is next to Acheen Head, and bounded on the W. by Pulo Gomez, Stony Island, and Pulo Chinchin, the two latter chained together by rocks; and Chinchin is only $\frac{1}{4}$ m. off Acheen Head. Pulo Gomez resembles two paps, its W. point being low, with an islet adjoining, and breakers projecting to the W. To avoid these, ships steering for the Surat Passage should keep nearest to Acheen Head, which is bold, with regular soundings, 12 and 14 fathoms, sandy bottom, at a moderate distance from it; and they may anchor occasionally, to stop tide, near that shore in 7 or 8 to 10 fathoms, water. The S. side of Pulo Gomez is also safe to approach; the depths are 24 to 15 fathoms, when its S. point bears E. from 1 m. to $\frac{1}{4}$ m. off, 18 fathoms with it E. by N. 2 m., 14 fathoms when E. by N. $\frac{1}{4}$ m. off, 13 fathoms when it bears E.N.E. about 1 m.; and regular soundings, from 20 to 35 fathoms, extend about 2 leagues to the W. of it and Acheen Head.

Acheen Head, in lat. $5^{\circ} 34' N.$, lon. $95^{\circ} 19' E.$, is a high, bluff headland, and forms the N.W. extremity of Sumatra: King Point is its S.W. angle, and is more than 3 m. to S.W. In approaching it from the S.W. no opening is perceived, the contiguous islands, Gomez, Nancy, and Brasse, appearing to join the main land. To the S. of King Point, at 5 m. distance, on the S. side of a low, green point, there is a sandy bay, which at a distance may be mistaken for the Surat Passage or a strait, the land there being low near the sea, and covered with trees. In this bay there is a rocky islet, and at its S. point two rocks above water, on which the sea breaks, with 12 and 14 fathoms near them, and the bay is lined by a reef fronting the sea.

If a ship about to enter the Surat Passage find the tide unfavourable, she ought to anchor under Acheen Head until the flood is made, which sets directly through the passage to the N.E., and the ebb opposite; after weighing with flood, she ought to keep nearest to Acheen Head, in passing between it and Pulo Gomez, where there are regular soundings and good anchoring-ground from 10 to 17 fathoms. The narrow gut, or gateway, at the E. end of the passage formed between Acheen Head and Pulo Chinchin, is only about a cable wide, with 30 and 35 fathoms, rocky bottom, and the tide sets through it with great rapidity, 5 and 6 m. an hour on the springs. If the wind be contrary, but the current favourable, a ship may *back and fill* through this narrow part, with her head towards the windward shore, keeping rather nearest to Acheen Head, which is perpendicular and steep-to; whereas, the shore of the opposite island is not so bold; this passage has been sometimes used by large ships, but it must always be attended with some risk. Although ships have been recommended to *back and fill* through the Surat Passage when the wind is contrary, yet the *Harriet*, Captain Bean, in doing so, was carried by eddies on the rocks and wrecked. Captain Bradshaw thought the safest way to proceed through this passage to the S., with a contrary wind, but strong current in your favour, is to reduce sail to three topsails when the N. entrance is approached, then keep the ship before the wind, letting her drift through; by this means she will be under the influence of the helm: whereas, in backing and filling, should an eddy strike the ship on either bow, she might be on the rocks before she could be checked by the head-yards.

Tides. In the Surat Passage, it is H. W. about 8 h., on F. and C. of moon; rise and fall about 8 ft. Variation, $1\frac{1}{4}^{\circ} E.$

ACHEEN, or ATCHIN TOWN, in lat. $5^{\circ} 35' N.$, lon. $95^{\circ} 25' E.$,* distant about 2 leagues from the E. end of Surat Passage, is a considerable town on the banks of a river, which falls into the sea by several branches, separating the low country into islands; and this low plain, formed between the foot of the mountains and the sea, is partly inundated during the rainy season. Rice, bullocks, poultry, vegetables and fruits may be generally got in abundance, and plenty of fresh water. The principal entrance of the river has a shoal bar, which a boat can hardly pass at L. W.; but vessels from 20 to 30 tons burden may enter the river at H. W., when the rise of tide is about 7 ft. on the springs; H. W. at 8 h. 45 m. on F. and C. of moon, subject to irregularities from winds

* We may expect to obtain useful information, and perhaps some corrections, to the assigned positions of the islands off this coast, after the completion of the Dutch military operations against the Achinese. In this event, further remarks may be found at the close of this chapter.

and ocean currents. The common anchorage of the road is in 8 to 10 or 14 fathoms, water, about 2 m. off the river entrance, in lat. $5^{\circ} 37' N.$, with it bearing S. $\frac{1}{4}$ E. to S.E. Here vessels are sheltered from the S.W. monsoon, which generally prevails from April to Nov. In the other season the E. winds are seldom strong, but N.-Westers happen at times; these blow into the Bengal Passage with great force, and require good ground-tackle to ride secure against them. But with these N.W. breezes, there is good shelter in Surat Passage, under the concave S. side of Stony Island, in 7 to 10 fathoms, water, with the S. point of Pulo Gomes bearing S.W., and Acheen Head E. $\frac{1}{4}$ N. In Acheen Road and near shore, land and sea-breezes are often experienced in both seasons, but the land-breezes are very partial, seldom extending beyond the islands.

The chief places of trade to the E. of Acheen are Pedir, Bourou, or Burrong, and Telesamoi, or Tulosamaway; but ships ought to be on their guard, and not put too much confidence in the people with whom they trade. The king of Acheen is often in a state of warfare* with some one or other of his subjects; and his fleet, sometimes consisting of 12 or 14 snows and brigs, usually cruise from Tulosamaway round to Soosoo on the W. coast.

Golden, or Queen's Mountain, situated a little distance inland, 8 leagues to the E. of Acheen, in lat. $5^{\circ} 29' N.$, lon. $95^{\circ} 41' E.$ by Commander Fell, is a high regular cone, about 6,900 ft. above sea-level, and seen about 92 m. from the deck of a ship in clear weather. When it bore S.S.W., distance from us 88 m., the summit was seen from the deck, a little elevated above the horizon. In clear weather this beautiful mountain, when visible, is a good mark for pointing out a ship's position in entering Malacca Strait, when her distance from the islands is too great to admit of any of them, or the land near Acheen Head, to be discerned. There is a small mountain to the E. of Golden Mountain, called in some old journals the Orphan, in lat. $5^{\circ} 28' N.$: the natives know these mountains by the appellation of Ya Mura, Ya Muree.

Ships departing from Acheen may, if bound to the N., pass out by the Bengal, or Malacca Passage, as circumstances render prudent. Those bound to the W. in the S.W. monsoon, might venture out by the Surat Passage, if the weather be favourable; but the Bengal Passage is preferable, keeping close to the islets off the N. end of Pulo Brasse, where a current will assist them in getting to the W. (*See also page 327.*)

THE PEDIR COAST, to the E. of ACHEEN HEAD. A brief description of this coast is here given, because we believe that (very soon) this part will be frequently sighted by Calcutta and Burmah steamers, as well as sailing-ships, during the S.W. monsoon, when a coaling depôt is established at the Chagos Islands. (*See the next chapter on Passages, also page 327.*)

The coast from Acheen to Diamond Point is bold and safe to approach, but you should not shoal under 10 fathoms off Point Pedro or elsewhere. The Golden Mountain is a magnificent land-mark, bearing W. by S., 11 m. from **Batoo Pedir**, in lat. $5^{\circ} 32' N.$, lon. $95^{\circ} 52' E.$, called also Pedir Point, a table-land of moderate elevation, off which you get 100 fathoms at 1 m. off the cape; but to the S.E. you could get anchorage off the towns of Batoo, Pedir, and Burrong, in 10 or 12 fathoms, about $\frac{1}{4}$ m. off shore. From Batoo Pedir the coast curves round first S.E., then E. by S., and lastly E. by N., to **Passangan Point**, in lat. $5^{\circ} 17' N.$, lon. $96^{\circ} 48' E.$; this point is deep-to, having 30 fathoms within $\frac{1}{4}$ m. of the beach, low and sandy, with a few cocoa-nut trees, and in one with Elephant Mountain bearing about S.W. $\frac{1}{4}$ S. The coast thence takes a general E. direction for 5 leagues, then falls back convex for about 3 leagues to Telesamoi Bay, where there is anchorage in 5 to 7 fathoms off the village, which has an old mud fort near it.

Telesamoi Point, in lat. $5^{\circ} 12' N.$, lon. $97^{\circ} 8' E.$, is steep-to, soundings of 10 fathoms being found at 100 yards from the beach; there is table-land to S.S.W. of the Point, and at a few miles to the W. there commences a belt of high casuarina trees, which mark the coast towards Agum-agum Village for 5 or 6 m. From Telesamoi Bay the coast (off which there are shoals for about 2 m. off) goes about E.N.E. for 20 m. to **Diamond Point, or Jambie Ayer**, in lat. $5^{\circ} 16' N.$, lon. $97^{\circ} 30' E.$, a low point, covered with trees, off which a spit extends to N. for 1 m. (according to Captain Fell, but for 2 m. on the chart), with 3 fathoms at its tip, deepening suddenly to 15 fathoms; therefore, do not shoal under 20 fathoms in passing Diamond Point.

The remainder of this coast will be described under the head of Malacca Strait.

WINDS near ACHEEN HEAD. The S.W. monsoon generally begins about end of April or early in May, between Acheen Head and the Nicobar Islands, and abates in Oct.; although in Oct., and also in Nov., W. winds frequently prevail. During the strength of this monsoon, from May to Sept., the weather is often cloudy, with squalls and heavy showers of rain at times: the

* The Dutch are now at war with the Achinese.

current then generally sets with the wind to the E., past the Nicobars, into Malacca Strait, but more commonly to N.E.; it is, however, liable to change, and set to the S. at times, particularly when the wind is light and veers to the W. When the current in the S.W. monsoon is running in betwixt the S. Nicobar and the islands off Acheen to the N.E., there is generally a counter or eddy current setting along the coast of Pedir to the W., which continues to set in that direction amongst the Acheen Islands to sea-ward. Therefore, all ships bound from Malacca to the W., should in this season keep near the coast of Pedir, and after reaching Acheen they may go out by the Surat Passage, if the weather be very favourable, or through the Bengal Passage in preference, observing to keep close round the islets off the N. end of Pulo Brasse; then take every advantage to tack with shifts of wind favourable for getting to the S.W. The *King George* and the *Worcester*, and many other ships, were greatly delayed by endeavouring to work out between the Nicobars and Pulo Rondo, against strong winds and N.E. currents in the S.W. monsoon; not knowing that a favourable current generally prevails close to the Sumatra coast, and among the islands.

The N.E. Monsoon mostly prevails in the entrance of Malacca Strait, between Acheen Head and the Nicobar Islands, from Nov. to May, which is the fair season. In Oct. and Nov. the winds are variable, frequently at N.W. and W.; although in some seasons the N.E. winds set in regularly in Nov. From this period to March, the N.E. monsoon is strongest, but at times liable to veer to the N. or N.W.; and W. breezes, of one or two days' duration, have been experienced in every month when the N.E. monsoon should prevail. Late in March or early in April, the N.E. and N. winds become light and variable. When the N.E. monsoon blows steadily, the current generally runs with the wind out of the Strait to the W. When the wind draws to the N., the current a little outside the Acheen Islands sets to the S. between them and the Nicobars; and when the wind veers to the W. or S.W., it generally runs into the Strait, or to the N.E.: so that the current there is, in its direction and velocity, mostly governed by the wind. This is, however, not *always* the case, for at times the current is found to run obliquely, or contrary to the wind, requiring the navigator to be cautious when no observations are obtained for latitude, more particularly when running for the entrance of the Strait during thick weather in the S.W. monsoon.

Current Rippings. In the entrance of Malacca Strait, near the Nicobar and Acheen Islands, and betwixt them and Junkseylon, there are often very strong rippings, particularly in the S.W. monsoon; these are alarming to persons unacquainted, for the broken water makes a great noise when a ship is passing through the rippings in the night. In most places, rippings are thought to be produced by strong currents, but *here* they are frequently seen when there is no perceptible current; the surface of the water is impelled forward by some undiscovered cause. The rippings are seen in calm weather approaching from a distance, and in the night their noise is heard long before they come near. They beat against the sides of a ship with great violence, and pass on, the spray sometimes coming on deck; and a small boat could not always resist their turbulence.

COAST FROM ACHEEN HEAD TO BANCOONGONG BAY.

The W. coast of Sumatra to Flat Point, its S. extremity in lat. $6^{\circ} 0' S.$, runs about S.E. $\frac{1}{2}$ S., and the distance 294 leagues; the Equator dividing it nearly in equal parts. Numerous small islands and dangerous shoals are interspersed along different parts of this extensive coast, and a chain of large islands, farther out, stretches parallel to it, at the distance of 18 or 20 leagues, between some of which there are safe channels. About 4 leagues nearly S. $\frac{1}{2}$ E. of Acheen Head, on the N. side of a small point, there is a cove, called **Siddo Harbour**, where cattle may be obtained. From 12 to 25 fathoms are good depths to preserve in coasting along. Off this place, and to the N., lie some rocky islets at a small distance, the largest of which is called Pulo Roosa; and 3 leagues farther S. lies **Saddle Island**, with contiguous rocks above water, distant 1 or 2 m. from shore. There is a peaked hill inland, in lat. $5^{\circ} 12' N.$ to the E. of Saddle Island, and two bays between it and Siddo Point.

Bank. From lat. $5^{\circ} 32' N.$, about 2 leagues W. of the Surat Passage, and stretching for 15 leagues to S. by E., to lat. $4^{\circ} 50' N.$ there is a bank of coral and sand, about 4 leagues off shore, said to have 4 fathoms water on its N. part, with 7 on its S. end, and 10 to 16 in the middle; and 30 fathoms close to it all round. Captain Bennet passed over it to N.W. from Pulo Roosa, several times in a small vessel. Captain Ashmore had 7 fathoms on the S. part of this bank, about 9 m. W. $\frac{1}{2}$ S. from the body of Pulo Rhio, and he crossed it several times in from 10 to 13 fathoms, between this situation and lat. $5^{\circ} 19' N.$, and states it to be a ridge, about $\frac{1}{2}$ m. in breadth, extending parallel to the coast nearly as far as Acheen Head, having 29 and 30 fathoms ooze on the inside, and a little outside no ground.

Oojong Dahway is a bold rocky headland, in lat. $5^{\circ} 5' N.$, and about $\frac{1}{2}$ m. W. by S. from it.

lies a cluster of rocks above water, called Battoo Booroo; there appears to be a clear passage between them and the point, $12\frac{1}{2}$ fathoms, hard bottom. These rocks are steep to all round, except on the N.W. part, where a coral reef extends off about $\frac{1}{2}$ m. A bay is formed between Oojong Dahway and Oojong Po, the next point to the S.E., where there is probably safe anchorage in a N.W. wind. **Oojong Po** is formed by two peninsulas; the outer one is a small round green hill without trees, and less elevated than Oojong Dahway: the surf generally breaks over rocks which join it to the inner peninsula. On the shore of the bay is Timbegah Hill, remarkable by itself, standing close to the water's edge, and seen at a great distance. From Oojong Po to Diah there is a coral reef, with from 2 to 8 fathoms, projecting about a mile from shore, with 14 fathoms mud near the outer edge.

Diah. There appears to be safe anchorage off Diah, with Diah River (called Quala Lambassoa) N.N.E. and Pulo Limpan bearing E. 1 m., in 12 fathoms mud. The fore-shore from Diah to the village of No, in lat. $4^{\circ} 55' N.$, is quite low; high land approaches the coast, leaving only a narrow strip of low land not perceptible in some places from the offing. Between Oojong Dahway and Oojong Soobahng the soundings are deficient, and therefore a good look-out is here necessary. **Pulo Limpan**, though quite small and lying close to the main, is easily distinguished from the offing by its reddish cliffs, about 60 ft. high, and a cluster of trees on its summit. It bears S. by E. $\frac{1}{2}$ E. 2 m. from Diah River. A coral shoal projects from it to the W. a short distance. Pulo Limpan is an excellent mark, and one that is scarcely possible to mistake.

BARBAH WIE BAY, formed by the points Oojong Soobahng, or Goobah, and Oojong Barbah Pahroa, has several coral shoals in it, rendering approach difficult and dangerous to a stranger. The one off Soobahng Point about 1 m. to the S.W., has only 12 ft., and generally breaks. This shoal is called by the natives Loongcarp* Soobahng. There is another shoal bearing W., $\frac{1}{2}$ m. from a point (Oojong Chenam Proeng) in the middle of the bay. The least water on this shoal is $2\frac{1}{2}$ fathoms, with 9 or 10 fathoms near it outside. But the most extensive and dangerous shoal, called Loongcarp Barbah Pahroa, lying much in the way of vessels, bears from Barbah Pahroa Point, W. by N., the outer extremity 2 m. distant; it is a mile in extent E. and W., and $\frac{1}{2}$ m. in breadth. Between the shoal and the point there is a clear passage with 14 fathoms mid-channel, muddy bottom. The least water found on this shoal by Mr. Gilles was $16\frac{1}{2}$ ft., although he thinks there may be less in some places. It breaks very heavily when there is any swell. There is a shoal projecting about 2 cables from Barbah Pahroa Point.

The Anchorage in Barbah Wee Bay is with Barbah Pahroa Point S.E. by S., and Chenam Proeng Point N.E. by E. $\frac{1}{2}$ E. in 11 fathoms, soft clay. A stranger should not attempt to enter without knowing the points, as both Soobahng and Chenam Proeng Points are low, and have nothing remarkable to distinguish them; the former, however, may be known by being about a mile S.S.E. of Pulo Limpan. To pass between the shoals, bring Chenam Proeng Point to bear E. $\frac{1}{2}$ N., and keep it so, until Pulo Limpan bears N. by E.; a direct course about E. $\frac{1}{2}$ S., or E. by S., may then be steered for anchorage. Coming from the S. with a free wind, it seems advisable to pass between Pahroa Point and the shoal; in which case Pulo Limpan should be kept N. $\frac{1}{2}$ W., until Pahroa Point bears E. by S., then steer direct for anchorage. With a S. wind and a N. current, a vessel passing outside would be liable to be swept down on Soobahng Shoal. There are four villages in the bay. Between Pahroa Point and Pulo Riah there appears to be no danger but what is visible, except close to shore. It may be proper to observe, that the inhabitants of Barbah Wee Bay and Diah are considered less worthy of confidence than any others on the coast.

Pulo Riah, or Rhio, is about $3\frac{1}{2}$ m. round, and about 300 or 400 ft. high, covered with trees, appearing level at a distance. On the S. and S.W. sides there are several rocky cliffs, from 30 to 80 ft. high. Pulo Riah may be known by the small islet, called **Pulo Mahnay**, in lat. $4^{\circ} 52' N.$, lon. $95^{\circ} 29' E.$, close to its W. extremity, with cocoa-nut trees on it; this islet is yellow sandstone, having cliffs about 40 ft. high. Pulo Riah is surrounded by a coral reef which always breaks, and projects in some places 2 cables' lengths from shore. In the bay formed by Pulo Riah and the coast to the N., there are several pepper ports on the main.

Telloo Crooet, or Krooet, bearing E. $\frac{1}{2}$ N. 2 m. from Pulo Mahnay, is the principal one. The usual anchorage for taking pepper at this port is on the N. side of Pulo Riah; but a vessel may lie on the S.E. side quite as near the town, and be sheltered from N.W. winds. A vessel bound to Telloo Crooet from the N., may pass mid-way between the N.W. point of Pulo Riah and the main, and anchor with Pulo Mahnay S.W., and the E. end of Pulo Riah S.S.E. $\frac{1}{2}$ E., in about 9 fathoms, mud. Bound in from the S., Pulo Mahnay should be rounded about 3 cables off; when Telloo Crooet Point is seen, or when Pulo Mahnay bears E. by S., a direct course may be steered

* *Loongcarp* in Acheonese language signifies a shoal that breaks, but is applied exclusively to detached shoals.

for the anchorage. It is not advisable to anchor nearer to Telloo Crooet than the above anchorage, as the bottom a little farther in becomes sandy.

Channel between Pulo Riah and the main land. In the above position, with a N.W. gale, in case of parting or driving, there is a chance of escape through the passage between the island and the main. The distance between them is about $\frac{1}{2}$ m., but the passage is made quite narrow by three or four small rocks, each about the size of a hay-cock, lying near the surface, with from 2 to 6 ft. on them. They are about mid-channel, near N.W. part of the passage. Close to the rocks, on the side nearest to Pulo Riah, there are 7 fathoms, increasing to 8 and 9, irregular soundings, towards the island; within 60 or 70 fathoms of the sandy point (the N.E., point of the island) it shoals suddenly to $3\frac{1}{2}$ and 2 fathoms. A vessel passing through this channel should keep about $\frac{1}{4}$ width of the passage from the island (counting from the trees); at this distance, passing from the N.W., there will be 8, 9, 7, $11\frac{1}{2}$, and 7 fathoms; probably not less than 7. Between the rocks and the main there is no safe passage; and a ridge of coral, with 4 and 5 fathoms, extends from the rocks to S.S.E., parallel to the main nearly through the passage. When the E. point of Pulo Riah bears S., and Telloo Crooet Point is to the N. of E. by N., you may steer down S. by E., in soundings as above (there will be breakers on the mid-channel rocks with a N.W. wind); when Telloo Crooet Point bears N. by E., and Pulo Riah E. side bears N.N.W., you must shorten sail, and haul up to S. by W. for about 2 cables, and then anchor in 8 or 9 fathoms, as soon as Barbah Wie Point comes to touch Pulo Riah.

Barbah Nepah Point, called also Ojong Glass, may be known by its ash-coloured cliffs, and a small rock off the point; also being the first point S.E. of Pulo Riah. A vessel may anchor anywhere between Barbah Nepah Point and this island. Barbah Nepah Village, about $\frac{1}{4}$ m. inside the point, has a river close-to, with good water. Between the river and point, coral reefs extend about $\frac{1}{4}$ m. off shore. To take pepper at Barbah Nepah, a vessel may anchor with the point bearing S.S.E., distant about $\frac{1}{2}$ m., in 10 fathoms, mud. This pepper port belongs to Telloo Crooet. Between Barbah Nepah Point and Pulo Cass, at a moderate distance from the shore, not coming under 10 fathoms, there appears no danger.

Pulo Cass is considerably elevated, and, like all the islands between Pulo Riah and Catapang or Kalapang Pahse, is a mass of black rocks, like iron ore, and covered with trees. The S.W. part is much higher than the N.E., and when bearing S.E., it resembles a spoon with a short handle, bottom upwards: from the N.W. point (on the *outside*) to the S.E. point it is quite steep, having 10 fathoms, mud, close to the rocks. From the N.W. point (on the *inside*) to the S.E. point there is a coral reef projecting from the island, near Pulo Kecheel; in most places the edge of the reef is distinctly visible, with 5 or 6 fathoms close to it. The anchorage is safe all round this island, but the best is with the S.E. point of the island about W.S.W., in $7\frac{1}{2}$ fathoms, mud, rather nearer to the island than the main, to avoid a sand-pit which projects a short distance from shore. Here a vessel is sheltered from all winds that blow with much violence on this coast, and in weighing may pass out on either side of the island, passing out to the N.W. from the anchorage, the least water, keeping mid-channel, will be $5\frac{1}{2}$ fathoms in the narrow part between Patty Point and the N.E. point of island. Bound into the anchorage, do not round the S.E. point of Pulo Cass at less than 1 cable off, as the reef extends from the point to nearly half that distance, with 3 fathoms on it, having 9 fathoms close to outer edge. **Patty** is a small pepper port inside Pulo Cass; joining the town is a small, green hill, covered with cocoa-nut trees, seen some distance from the S. **Pulo Kecheel** is a small islet with trees on it, about $\frac{1}{4}$ m. from Pulo Cass; a range of twenty rocks above water project in a straight line to the W., for nearly $\frac{1}{4}$ m. from Pulo Kecheel; there are 7 fathoms close to the outer one. On the side next Pulo Cass there are 3 or 4 fathoms, coral, close to them, deepening with some regularity towards that island; but the bottom is hard at least half-way, and the vessel anchoring on this side of Pulo Cass should keep nearer to the island than the rocks, where the bottom is soft, in $8\frac{1}{2}$ fathoms. We lay several days outside, with Pulo Cass bearing about E., distant 1 m., in 12 fathoms excellent holding-ground. From Pulo Cass to the Pehjabah Islands there appears to be no danger. About $1\frac{1}{2}$ m. S.S.E. from Pulo Cass, a rocky bank was found, least water $8\frac{1}{2}$ fathoms, but the natives say there are 7 fathoms; extending N.W. and S.E. about 1 m. This was the only cast of hard bottom at 1 m. from shore, between Diah and Catapang Pahse, excepting the shoals placed on the chart.

The **Pehjabah Islands** form the harbour of Telloo Goolumpung (one of the most considerable pepper ports on this part of the coast); they are distant about 1 m. from the main, are quite small, and lie close together. The largest is called Pehjabah Besar; the smallest and outer one is called Pehjabah Kecheel. They are both about the same height; the smallest has a round appearance on top, with a smooth outline, the trees being more uniform in height than on the other, which has several high trees on it, giving it a more irregular appearance. There is a coral reef, with

2 fathoms, extending about 150 fathoms from the inside of these islands. A rock, 15 or 20 ft. high, stands 2 cables to S. by W. of the Outer Island, with 11 fathoms close to on the outside; there is also another rock, nearly even with the water's edge, which always breaks, bearing S. by E. from the same island. Inside the Pehjabahs near the main is **Pulo Cleung**; larger and higher, about 300 or 400 ft. high; but, lying close to the main, is not so conspicuous as the Pehjabahs; it is bold all round, except on the inside, and, like the Pehjabahs, is covered with trees. Telloo Goolumpung Point, or peninsula, is a green hill, about as high as Pulo Cleung, with a few scattered trees and a house on the summit; it is based with rocky cliffs, and connected with the main by a low, sandy isthmus; and at some bearings has the appearance of an island.

TELLOO GOOLUMPUNG. Vessels bound to Telloo Goolumpung usually pass between the Pehjabahs and Pulo Epoo Cheechem. The only danger in the way is the small rock before mentioned, which bears from the Little Pehjabah S. by E., distant rather more than $\frac{1}{2}$ m.: it always breaks, and there are 10 fathoms close to it. Telloo Goolumpung Point has 8 fathoms on the outside close to the cliffs. The best anchorage at Telloo Goolumpung is with the Pehjabahs N.W., and Pulo Cleung N.E. by N., in 10 fathoms, mud and sand: but in shipping pepper it is customary to anchor much nearer the town on a line from Telloo Goolumpung Point to Pulo Cleung, about half-way, in 8 fathoms. A vessel lying here from April to Sept. should moor with two heavy anchors to the N.W., as the bottom is sand, and there is no room to drive, nor means of slipping and putting to sea.

Pulo Cheechem is a high, bluff land, similar on most bearings to a Scotch cap: rocks above water extend to S.S.E., from the S.E. part about a cable's length, with $8\frac{1}{2}$ fathoms close to the outer rock. There is also a coral reef, with 2 fathoms, extending about $1\frac{1}{2}$ cables from the N.E. part of island. **Pulo Epoo Cheechem**, which is less than $1\frac{1}{2}$ cables to the W. of Pulo Cheechem, is much lower than the latter, and not visible above the horizon when Cheechem is seen distinctly. Bearing about N.N.E., or S.S.W., it resembles a gunner's quoin, though the outline is rather uneven. It has 10 and 11 fathoms close to, outside. Three black rocks lie about $\frac{1}{2}$ m. E. from Pulo Cheechem, having $5\frac{1}{2}$ and 7 fathoms close to them: there are no rocks or shoals near them outside; on the inside there are a few small rocks even with the water's edge.

Rahnnoo, a considerable pepper port belonging to Telloo Goolumpung, is about E. by S. $\frac{1}{2}$ S., $1\frac{1}{2}$ m. from Pulo Cheechem. The best anchorage at this port is with Pulo Cheechem N.W. by N., and the S. black rock N.E. $\frac{1}{2}$ E., in 10 fathoms, mud and sand, distant 1 m. W. $\frac{1}{2}$ S. from Rahnnoo; nearer to the town the bottom is sand, and several casts of coral and shells. The natives will insist upon vessels coming much nearer; but in anchoring on this coast the safety of the vessel should be considered more than convenience of shipping pepper, as there are few ports on the coast of Sumatra where the natives will furnish more pepper in a day than can be easily shipped if the vessel lies within about $1\frac{1}{2}$ m. About $\frac{1}{2}$ m. to the S. of Rahnnoo is a small island, called **Pulo Epoo Rahnnoo**, to distinguish it from Pulo Epoo Cheechem. Though lying within a few fathoms of the shore, and joined to it by rocks, it is distinct from the coast, being entirely different; the shore from Telloo Goolumpung Point to Rigas being quite low, the trees growing close to the sandy beach. Pulo Epoo Rahnnoo is a pile of rocks, about 50 ft. high, with trees on the summit; there is also a rock above water nearly joining the island on the N.W. side. A dangerous rock bears from this island W. by S. $\frac{1}{2}$ S., and $\frac{1}{2}$ m. off, which seldom breaks; the least water found at spring-tides was 11 ft. The shoalest part is not more than $\frac{1}{2}$ cable across, and very ragged and uneven, with 11 fathoms, mud, close to the outer edge; the bottom could not be seen; when on the shoalest part, the outer points of Pulo Epoo Cheechem and Pulo Pehjabah Kecheel were exactly in a line. By keeping the Pehjabah in sight to the W. of Pulo Epoo Cheechem, you will be outside; and when Pulo Epoo Rahnnoo and the peak of Rigas Hill are in one, you will be about $\frac{1}{2}$ m. to S.E. of the shoal. There is also a cluster of rocks above water bearing S. $\frac{1}{2}$ W. from Pulo Epoo Rahnnoo, distant about $\frac{1}{2}$ m.; close to them, on the outside, are 8 and 9 fathoms. Between Pulo Epoo Rahnnoo and Rigas Point there is a bay, full of coral shoals; in this bay is a small pepper port, called Jahbee.

Rigas Point, or Ojong Bahroos, is a low rocky point, covered with trees, a little more elevated than the land joining it; a short distance back there are one or two hills, with a number of scattered trees. In the direction of Pulo Rangas, near the point, there are $8\frac{1}{2}$ fathoms, hard bottom; and at $\frac{1}{2}$ m. farther off there are 10 fathoms, mud. From the Point towards Rigas Bay, the shore is lined with a coral reef as far as Ojong Ramboon; about $\frac{1}{2}$ m. from Rigas Point it projects in one place 2 cables from shore: dry in some places, with a small detached rock, which always breaks. Ojong Ramboon is a steep hill, forming the N.W. point of Rigas Bay; the passage between it and Roosum Island is about $\frac{1}{2}$ m. wide, with several rocks above water.

PULO RANGAS, known formerly as **Pulo Cap**, in lat. $4^{\circ} 38' N.$, lon. $95^{\circ} 38' E.$, is a pile of

rocks, 50 or 60 ft. high, covered with trees, several of which are lofty: the frequent rains on this coast cover everything with vegetation; large trees are seen growing on rocks with apparently little or no soil, and every mountain is closely crowded with lofty trees from base to summit. The highest trees on Pulo Rangas are just visible in a clear day at $17\frac{1}{4}$ m. distance, the eye elevated 20 ft. On the inside of the island, next the main, there is a coral bank, with 3 and 5 fathoms projecting a cable's length, with 12 fathoms close to the outer edge. Nearly a cable off the N.W. point, is a small rock, which always breaks; on every other side it is bold, having 12 and 13 fathoms close to.

Anchorage. A vessel may anchor on either side of Pulo Rangas within $\frac{1}{4}$ m., to take shelter from a N.W. or S.E. wind, in about 12 and 13 fathoms, mud. On the S.E. side there are two high rocks, nearly joining the island, steep to all round. There is also good anchorage anywhere inside of Pulo Rangas, in the direction of Rigas Point, or Pahse Rock, level clear bottom 11 fathoms, olive-coloured mud and fine sand. The surveying vessel lay twelve days at single anchor, surveying Rigas Harbour and coast half-way between Pulo Rangas and the Pahse Rock, in $11\frac{1}{4}$ fathoms; blowing fresh at times from the S., with a strong lee current. Though the bottom is not soft, we found some difficulty when we weighed anchor in breaking ground. Between Pulo Rangas and the main are three small rocks, about 3 or 4 ft. high. The nearest one to this island, bearing E. by S., distant $\frac{1}{4}$ m., is called *Cap Rock*; *Roosum Rock* lies within $\frac{1}{4}$ m. of Pulo Roosum; the third, called *Pahse Rock*, bears from the W. point of the large Pahse about S.W., distant $\frac{1}{4}$ m. These rocks give the place a dangerous appearance; but there is no more danger than if they were so many wharfs, as there is deep water within 5 or 6 fathoms of them all round. About N.N.W., and $\frac{1}{4}$ m. from Roosum Rock, is a small steep rock, with $2\frac{1}{2}$ fathoms; but this is not in the way of vessels.

RIGAS ISLANDS. Pulo Roosum, the largest, is about $\frac{1}{4}$ m. long, across the entrance to Rigas Bay; the outside is high, with steep rocky cliffs, and covered with trees: on the inside there is a small space of low land, with a number of cocoa-nut trees. Pulo Engahng, the next island to E. of Roosum, is a pile of steep rocks, also covered with trees. Pulo Sammote is low, with no rocky cliffs, and has a number of trees on it. Pulo Poogahse is a rock, or rather two rocks joined; on the top are a few bushes, or small trees; nearly all the land outside is high; the only marshy land is on the main at N.E. part of the bay. Chellung Peninsula is higher than the islands, being 400 or 500 ft. in height, with lofty rocky cliffs. Like all the land in the vicinity of Rigas (excepting that under cultivation), it is closely covered with trees from summit down to cliffs: joined to the main by a low sandy isthmus, and appears like an island. The part called Oojong Chellung forms the S. part of Rigas Bay. Oojong Battoo Tootung, about $\frac{1}{4}$ m. inside Chellung Point, is also rocky and high; between these points is a cove, $\frac{1}{2}$ m. deep, with a sandy beach.

Rigas Harbour is formed by Pulo Engahng, Pulo Sammote, and Oojong Battoo Tootung, the depths from 4 to 6 fathoms; it is about $\frac{1}{4}$ m. in length and $\frac{1}{2}$ m. in breadth; though this bay is 4 or 5 m. round, this is the only anchorage where a vessel can lie in safety; the remainder is much covered with coral reefs, dry in places at L. W. Inside Pulo Roosum, between the reefs which join that island and those off Pulo Poogahse, there is a clear space, with $3\frac{1}{2}$ and 4 fathoms, sand, sufficient room for a vessel to heave down, and where the water is always smooth. By buoying the channel, a vessel could be warped in between Roosum and Engahng; there is also a passage round N. side of Roosum, but more difficult of access. Near Oojong Battoo Tootung is a small cove, where a vessel might heave down to the rocks on shore. The town of **Rigas**, on the N.W. side of the bay, is a considerable pepper port, with the small ports of Chellung, Battoo Tootung, Jahbee, and Pahng-ah attached.

The Entrance to the harbour is between Pulo Roosum and Oojong Chellung: there is nothing in the way except a small rock, which bears from Oojong Chellung about W.N.W. rather more than $\frac{1}{4}$ m. off, and 2 cables to S. of Pulo Roosum. This may be avoided by keeping the S. point of Pulo Sammote (bearing about N.E. by N.) in sight to the S. of Pulo Engahng. This will carry you mid-way between the rock and Chellung Point; when abreast of the Point, keep more to the E., passing about a cable to the S. of Pulo Engahng. Oojong Chellung is quite bold, having 7 fathoms close to it; from that depth it gradually shoals to the anchorage, which is in about $5\frac{1}{2}$ fathoms, mud, with the S. end of Pulo Engahng about W.S.W., and Pulo Poogahse in a line with Rigas Bazaar; and Oojong Battoo Tootung S.E., distant about 2 cables; this point is about $\frac{1}{4}$ m. to N.E. of Oojong Chellung. Between Pulo Engahng and Pulo Sammote, a line of coral reefs (dry in places at L. W.) forms the N.W. boundary of the anchorage. Rigas Harbour is nearly land-locked, and one of the best on the coast; but well known to be unhealthy. But there is a safe place to anchor outside, convenient to ship pepper, where a vessel would have the pure sea-breeze.

The Outer Road is inside Roosum Rock (*see* plan of Rigas Bay), where the bottom is very

fine olive-coloured sand, or sand and mud: not any other kind of bottom near the anchorage, which is with Roosum Rock bearing W. by S. $\frac{1}{4}$ S., distant 2 cables, and the rocks of Rigas Point just touching the inner point of the Pehjabah Besar, in 9 fathoms. A vessel appears to be very near the Roosum Rock, but as she swings in that direction only with the land-wind, no wind from that quarter can ever force her on it if she be moored with a good scope, which should be done without delay, as currents and variable winds will soon foul the anchor. From Oct. to April the heavy anchor should be placed to the S., and stream anchor to N.W.; and the reverse after April has commenced, as the N.W. winds are then expected. A buoy placed as a mark to anchor would be useful previous to entering this anchorage. A vessel here will be the same distance from Rigas Town as at anchorage in the harbour, about $1\frac{1}{2}$ m.; and with fresh breezes from the S., the boats had no difficulty in bringing off pepper. This anchorage is not so safe in a gale as the harbour, but at other times quite as much so. On this coast gales are of rare occurrence, and they seldom blow directly on shore, but more frequently along the coast. With N.-Westers (which, with few exceptions, are the only winds that blow with much violence) there probably would not be too much sea for a vessel to ride with safety. If there should be, there is abundance of room to slip and go into the harbour or go to sea, passing on either side of Pahse Rock. At such a time, the position of the small rock which lies in a line with the harbour would be as well known, by its constantly breaking, as if it were above water.

A vessel out of season for pepper, and waiting for the crop, which is frequently the case, should by all means lie outside the harbour until the pepper is ready. Should the anchorage inside Roosum Rock be considered unsafe, she may anchor anywhere inside Pulo Rangas; but the best place appears to be between Rangas and Roosum Rocks, where the bottom is soft, and where it would be convenient to communicate with the town. Telloo Goolumpung, Pulo Riah, and all ports in this vicinity are quite healthy. In passing to and from shore, boats should be cautious to avoid a coral spit which projects from the N.W. and W. parts of Pulo Roosum nearly $\frac{1}{4}$ m. off; which breaks sometimes, with intervals of 10 or 15 minutes; also a small rock, which lies near the edge of the reef, between Rigas and Rambon Points: nearly even with the water's edge, but when the sea is smooth, it breaks only once in 8 or 10 minutes.

Rigas Hill, or Booket Kwali, in lat. $4^{\circ} 41' N.$, lon. $95^{\circ} 40' E.$, one of the best marks on the Sumatra coast, is very high and seen off deck in clear weather 43 m. It has no high hill near it, and is easily known: nearly the whole of the S. side is cleared, and has the appearance of land under cultivation. The Peak is covered with trees, and bears from Rigas Town about N. by W., distant $1\frac{1}{2}$ m. When bearing about S.E., it makes two peaks, the N. one lower and smaller, each side of the hill sloping very gradually, the S.E. terminating in Rigas Bay; when bearing N.W., it makes with only one peak, the sides appearing much steeper than when bearing S.E. This hill, seen in clear weather near Ojong Booboon, then appears to be the W. extremity of coast, standing out separate and distinct, like an island.

Pahsi Islets are two small rocky groups, with trees; to the S.E. of Chellung Peninsula, the outer one distant $1\frac{1}{2}$ m.: the passage between them and the peninsula is intricate and unsafe: there appears no danger near their outside except the Pahsi Rock, which is above water, with perpendicular sides, and having 10 and 11 fathoms within a few feet of it; there are also 10 or 11 fathoms near the islets. Inside the Pahsi Islets is Chellung Bay, easy of access, and with excellent shelter from N.W. winds. A vessel compelled to leave any anchorages to the N. in a N.W. gale should anchor anywhere between the islets and the main, in smooth water and a moderate depth. The existence of a shoal, however, near the anchorage, the position of which is not known, will prevent this harbour from being used until it has been ascertained. **Catapang Pahsi** is a village on the main, bearing E. by N. from the largest of the Pahsi Islets, distant nearly $2\frac{1}{2}$ m.; it may be known by a cluster of cocoa-nut trees and several houses.

Pangah is a small pepper port, 5 m. to the S.E. of Catapang Pahsi; the coast near here is low, with a sandy beach, and no mark as a guide but a small break in the arroon trees. From Catapang Pahsi to Ojong Booboon, or Boekoean, the coast extends 33 m., nearly S.E., quite low, with a sandy beach, without any points or a single hill near the shore, which is closely crowded with arroon trees, similar in appearance to the pine. They commence near Catapang Pahsi, and extend to Wylah River, a distance of about 25 m., level and uniform, with scarcely a break. From Wylah River, for about 2 m. to the S.E., there is an opening, where there are no high trees except five or six very tall ones, standing close together in centre of opening: very conspicuous in the offing; there are also a few cocoa-nut trees, and several houses a short distance to the S.E. of them; but the latter cannot be seen far. From this break the arroon trees again commence, and extend in the same close and uniform order 4 or 5 m. farther, and terminate close to Ojong Booboon. This is the best mark to distinguish this point, as there is not one arroon tree between it and Analaboo. This coast

appears safe to approach within a moderate distance ; no shoals are known to exist, though it is said there is one near Wylah River, not far from shore. **Point Bubon, or Boobooang**, in lat. $4^{\circ} 14' N.$, 11 m. to the N.W. of Analaboo, is conspicuous from a dark cluster of trees upon it resembling a bonnet, and the coast here is safe to approach to 12 fathoms. If bound to the village of Boobooang, bring the woods to the S. of it to bear N., then steer in for it till in $3\frac{1}{2}$ fathoms, if in a small vessel.

ANALABOE, or Malaboo, or Oojong Cahrang, in lat. $4^{\circ} 8' N.$, lon. $96^{\circ} 12' E.$, distant 16 leagues S.E. from Rigas, may be known by cocoa-nut trees on the low rocky point that forms the N. side of the road, appearing like an island when first seen, the land being low along this part of coast. A ship may anchor here with the point bearing about N.W., in 7 or 8 fathoms, on the S. side of a reef that projects from the N. side of a small rivulet, and procure wood, fresh water, or other refreshments. You may anchor in 5 fathoms, with the S. point of cocoa-nut trees W. $\frac{1}{2}$ S., distant about $\frac{1}{2}$ m. and will be sheltered from N.-Westers. A reef projects $\frac{1}{2}$ m. from the point, which is steep-to, with only 5 ft. water on it, and the sea breaks over it most in blowing weather. There are four shoals near the point ; one most in the track of vessels entering the port is called Loongcarp Oojong Cahrang, and bears about S.W., $\frac{1}{2}$ m. from the point ; the shoalest part found was 11 ft. Another shoal bears W. $\frac{1}{2}$ N. from the point, also about $\frac{1}{2}$ m., and has very little water on it, with 6 and 7 fathoms mud close outside. At $\frac{1}{2}$ m. to N. of this, there is another small shoal with a roller on it ; and another shoal with Analaboe Point E. by S. $\frac{1}{2}$ S., distant about 2 m., with not more than 5 or 6 ft. Fishermen who accompanied Mr. Gillis to examine these shoals, said there were no others, though there were several near shore in the direction of Bubon.

A vessel bound to Analaboe from the N., with a free wind, should not come under 8 fathoms when rounding the point. When the point bears N.E., about 2 or $2\frac{1}{2}$ m., there will be 8 fathoms regular soundings. A vessel passing outside that depth, with a strong N.W. wind, would find difficulty to reach anchorage without tacking. As soon as the landing-place can be seen, or when the point bears N.N.E., a direct course may be steered for the anchorage. A considerable trade is carried on here in pepper, and several American and other ships procure full cargoes in the season. The Rajah is favourably inclined to those who come to trade at this place. The soundings from the land of Acheen Head to Cap Island (Pulo Rangas), are in some places irregular over a rocky bottom, the depths generally 18 to 30 fathoms from 1 to 3 leagues off shore. In this space, ships should keep 2 or 3 leagues from land in the night, to give a proper berth to the rocky isles along the coast. From Cap Island to Analaboe the soundings are more regular, and bottom soft, where the shore may be approached to 11 or 12 fathoms, and occasionally to 9 fathoms ; but not under this depth in passing Analaboe Point, as nearly 1 m. to S.W. from it lies a coral shoal, which after passing you may stand in to the bay, and anchor in 5 fathoms with the River's Point about N., and the S. point W. $\frac{1}{2}$ S.

Shoals. From Analaboe to Cape Felix or Oojong Rajah, the coast runs S.E., 11 leagues, and may be approached to 11 or 12 fathoms, or 7 or 8 m. off shore ; near Cape Felix, and about 4 or 5 m. from shore, the water deepens suddenly to 26 or 28 fathoms, and the coast trends from it E. to Soosoo. To the S. of Tadoe, about 5 m. off, a coral reef is marked on the chart ; and at 5 m. farther to S.E., abreast Oojong Trepah (which lies about $\frac{1}{2}$ way from Analaboe to Cape Felix) and in the track of 9 fathoms, there is a coral shoal of 3 fathoms, and perhaps less water, at 3 m. from shore ; on this the *Countess of London* nearly touched when in stays, with Cape Felix S.E. by E. $\frac{1}{2}$ E.

CAPE FELIX, or Oojong Rajah, in lat. $3^{\circ} 44' N.$, lon. $96^{\circ} 36' E.$, is a low level headland, bold to approach, bearing W. from Soosoo Town, distant $5\frac{1}{2}$ leagues, and forms the W. extremity of the bay. The cape is difficult to distinguish, but there is a small flat house, built of mats, $\frac{1}{2}$ m. to the E. of the cape, by which, if within $1\frac{1}{2}$ or 2 m. of shore, it may be known ; the house has generally one or more white flags on it. A small coral shoal is said by the natives to lie close inshore just to the N. of the cape.

Off-shore Dangers. Bearing W. by S. $\frac{1}{2}$ S., about 14 m. from Cape Felix, there is also a 4-fathom shoal. The English brig *Heldrans* sounded on another of 5 fathoms, Cape Felix bearing N.E., and lat. observed $3^{\circ} 35' N.$ South from Cape Felix 12 m., and 18 m. to S.W. of Qualla Batoo, the ship *Suffolk*, in 1827, passed over a 4-fathom shoal with 55 fathoms no ground just inside of it ; and a little distance, say $\frac{1}{2}$ m. to the N.W., is another small shoal, with deep water between. These out-lying shoals seem a peculiar feature of this W. coast of Sumatra.

Qualla Batoo or Kwala Batoe, is about 3 m. to the W.N.W. of Soosoo, and during the N.W. monsoon, one of the safest and best roadsteads on the coast. Coasting along from Cape Felix, 5 or 6 m. off shore, in 28 or 30 fathoms, a ship may stand on to the E. in this depth, which will lead outside the shoals, until two clumps of trees like islands, about a mile apart, are seen ; these are the points of Soosoo Bay ; and when the S.-most clump (on Soosoo Point) bears N.E. $\frac{1}{2}$ E., she

may steer towards it until the houses at Qualla Batoo bear N., then steer direct for them, which will carry you mid-channel between the shoals; three of them on the left hand, the S.-most of which bears S.W. by W. nearly 3 m. from Pulo Khio; and one on the right hand, $\frac{3}{4}$ m. distant from Pulo Khio: the sea generally breaks on them. The anchorage at Qualla Batoo is in 20 to 22 fathoms, with Pulo Khio E.S.E., the river's mouth N. $\frac{1}{4}$ W., and Cape Felix about W. $\frac{1}{4}$ S. About 4 or 5 m. to the W. of Qualla Batoo there is a shoal, which lies in a direct line between Cape Felix and Soosoo Point. Small ships frequent this place, to procure pepper and other articles of trade: but it is prudent to be always guarded against the perfidy of the natives, who have been several times successful in assaulting and taking possession of ships which came to trade with them.

SOOSOO or SOESOE BAY contains several dangerous shoals, covered with 1, 2, and 2 $\frac{1}{2}$ fathoms water; there is also much foul ground in it, with overfalls from 20 to 10 fathoms; but the channel is wide and safe between shoals on the W. side of the bay, and those to the S. of Soosoo Point. A ship bound into the road, after coasting about 2 or 3 leagues off, in 28 to 35 fathoms, when the road is approached, ought to keep a boat ahead to sound, if unacquainted, and steer in with Soosoo Point, or the entrance of the river, bearing about N.E., or the town N.E. $\frac{1}{4}$ E. Pulo Khio, the N.W. point of the bay, lies 1 $\frac{1}{4}$ or 2 m. to the W. of Soosoo Point, and resembles it when first seen; it has the appearance of an island. A ship may anchor in 18 or 20 fathoms, with the houses of Soosoo N.E. by E., about 2 m. off shore; or by choosing a clear berth with the boat, she may move into 9 or 10 fathoms near the entrance of the river, and anchor with Soosoo Point E.N.E. Soosoo Point appears with two or three trees close to the houses, like a small island. Steering in with it about N.E. $\frac{1}{4}$ E., a tall tree near the middle of the bottom of the bay will be seen, which bring N.E. $\frac{1}{4}$ N., and steer direct for it until in 10 or 11 fathoms soft ground, and then anchor within $\frac{1}{2}$ m. of Soosoo Point. The *Royal George*, at anchor in 18 fathoms, had Cape Felix W. $\frac{1}{4}$ N., the S.-most extreme of land S.E. by S., and Soosoo Town E.N.E., distant about a mile. Soosoo Town is in lat. $3^{\circ} 43' N.$, lon. $96^{\circ} 52'$. About 2 $\frac{1}{2}$ leagues to S.E. of Soosoo, on the S.E. side of a bluff point (N. Tellapoe Point) of arroon trees, there is a place called **Mungien**, with anchorage in 9 $\frac{1}{2}$ fathoms, inside of a rocky shoal that lies about 1 $\frac{1}{4}$ m. about S. by W. from the point. Off N. Tellapoe Point is another shoal, which almost always breaks, but there is a passage of 10 fathoms inside of it; but to the W. of this place, at nearly 5 m. off, a shoal has been found; and a cluster of shoals from 2 to 3 leagues to W.S.W. of N. Tellapoe. Laban Hadj, about half-way between Mungien and Muckay, is also an anchoring-place for procuring pepper, having a sand-bank and other dangers fronting it, with several corally heads, 3 $\frac{1}{2}$ leagues off shore. A good chart and a good look-out are essential in this locality.

Muckay, or Mukkie, in lat. $3^{\circ} 28' N.$, is a small place, where coasting-vessels stop at times to trade: if bound into this place, bring the low point that forms the W. arm of the Bay of Muckay to bear N.E., and steer on this bearing till within $\frac{1}{4}$ m. of it, which will clear the shoals; but anchorage is not good within the N.W. point. There are two shoals off Muckay in 23 fathoms, one bearing W.S.W. about 2 $\frac{1}{4}$ m. from the S. bluff point of Muckay Bay, the other S.W. 3 m. from the same point, and they bear nearly N. and S. of each other: the former has only 11 ft. on it, and the latter 2 $\frac{1}{2}$ fathoms. A course S.W. from Muckay will lead between the shoals, and when in 27 fathoms you are outside of them. Native fishermen say that there is a shoal with only 11 ft. on it, S.S.W. from Muckay Point, 6 or 7 m. distant. The course from Cape Felix to Muckay is S.E. by E. $\frac{1}{4}$ E., in which track a ship should not come under 27 fathoms, water, as there are several dangerous shoals within this depth; also many shoals beyond this depth, some of which are dangerous, so that the lead will scarcely be any guide. Between Muckay and South Tellapoe, about mid-way, there is a small island called Pulo Soorvodung, close to shore, between which and Tellapoe lies a 3-fathom shoal; it is about a mile off shore, and bears S. 1 $\frac{1}{4}$ m. from the island.

South Tellapoe, or Tallabou, in lat. $3^{\circ} 22' N.$, and 7 m. S.E. from Muckay, is a place where pepper may sometimes be obtained: the best anchorage is with the point N. by E. in 17 fathoms, under which depth the ground is frequently foul. Labanack is a small place, in lat. $3^{\circ} 20' N.$ There is a remarkable white rock about 2 m. to the S.E. of Tellapoe; it is called by the natives Battoo Ply-eah. Between this and Tumpat Tuan are the small pepper ports of Samah Duah, Eah Moodoong, and Tellou Cattapung. Along this coast the soundings are very deep, but it is said to have many corally, shoal rocky heads from 3 to 8 m. off shore.

Tumpat Tuan Point, the S. extreme of the high land seen from Soosoo, distant from it about 12 leagues, is in lat. $3^{\circ} 16' N.$, lon. $97^{\circ} 18' E.$, having two reefs lying at 1 m. and 2 m. off the Point to sea-ward, with anchorage in 15 to 22 fathoms close on E. side of the Point, with it bearing about W., and the village N.W. by N., distant 1 m. About a mile W. by N. from Tumpat Tuan Point lies a small round rock, like a boat, with a rock visible off the extreme point, which may be rounded close, having 27 fathoms at a small distance. In the bottom of the bay there is a reef, on which the sea usually breaks, rendering it unsafe with Southerly winds.

There are two rocks above water off Tumpat Tuan Point, one called Batto Copeah, or Cap Rock, bearing S.W. about a cable's length from the Point; the other, called Battoo Toonkal, or Stick Rock, bearing W. $\frac{1}{2}$ N., $\frac{1}{2}$ m. from it, having 30 fathoms close to its outer edge; there is also a coral shoal of 3 fathoms, and perhaps less water, bearing from the Point W. by S. about $1\frac{1}{2}$ m. There are two coral shoals in the small bay: one bearing about N.E. by E., $\frac{1}{2}$ m. from the Point; the other near the E. part of bay, bearing from the point E. $\frac{1}{2}$ S. and $\frac{1}{2}$ m. off. Here you are sheltered from N.W. winds, with the Point bearing W. $\frac{1}{2}$ S. to W. by S., and the village N.W. to N.W. by N. Along this part of the coast, between Acheen Head and Soosoo, the weather is generally settled and fine in the Northerly monsoon, with frequent land and sea-breezes.

Point Labon, or Oojong Caloat, in about lat. $3^{\circ} 8' N.$, is 20 leagues to the S.E. of Cape Felix; and in sailing between them, great care is requisite to avoid several shoals along the coast. The *Lord Castlereagh* struck on one of them in lat. $3^{\circ} 4' N.$, distant about 10 m. from shore, and had no ground 40 fathoms close to it. This seems to be the shoal called Lagootsong by the natives, bearing S.W. from Tumpat Tuan Point, with only 10 ft. water on its shoalest part, as stated by Captain Bennet, who struck on it in one of his voyages from Bengal to this coast. Betwixt lat. 3° and $3^{\circ} 50' N.$, he was very close to several other shoals before they were observed.

Out-lying shoals. In lat. $3^{\circ} 30' N.$, the *Royal George* passed over the tail of a shoal in 6 fathoms, when the rocks were seen alongside; a little outside of it they had no ground 85 fathoms, and 45 fathoms close to it on the inside. This appears to be the same bank on which the *Albion* had 5 fathoms in lat. $3^{\circ} 30' N.$, and 4 or 5 leagues off shore; she hauled to the S.W., and soon deepened to 50 fathoms, no ground. In lat. $3^{\circ} 14' N.$ there is another shoal, with 4 fathoms, or less water on it, and 20 fathoms at a small distance inside; when at anchor on it in 5 fathoms, the extremes of the coast bore from N.N.W. to S.E. by E., and the White Rock N.N.E. $\frac{1}{2}$ E., distant off shore about 3 leagues. Shoals are thus described by Captain Endicott:—A dangerous shoal lies in lat. $3^{\circ} 4' N.$, with Tumpat Tuan Great Hill bearing N. Another shoal lies in the neighbourhood of Tumpat Tuan, on which the English brig *Sophia*, drawing only 11 ft., struck; its position is not well ascertained; but the *Sophia*, after getting off, steered N. $\frac{1}{2}$ E., and soon saw the vessels at South Tellapoe right ahead. It is supposed to lie about S.W. from Tumpat Tuan Point. Another shoal, also dangerous, lies in lat. $2^{\circ} 58' N.$, with Tumpat Tuan Great Hill N. by E.; the brig *Governor Endicott* passed close along its E. side, and saw it break several times. There is also a shoal of 3 fathoms, with Tumpat Tuan Great Hill N. by W. $\frac{1}{2}$ W., and Pulo Munkie about E.N.E.; it has 34 fathoms close to it.

Pulo Munkie, in lat. $2^{\circ} 55' N.$, is an islet with a few cocoa-nut trees, about $1\frac{1}{2}$ m. off Oojong Kamarang Point, with a 6-fathoms channel between. A sandy islet, or bank, lies about 1 m. to S.E. $\frac{1}{2}$ S. of Munkie. Between Tumpat Tuan and Pulo Munkie, the coast at 3 or 4 m. distance is considered free from danger, with regular soundings. Along this shore there is commonly a tremendous surf and dangerous landing, except in the native boats: the coast has generally proved unhealthy, and frequently fatal to ships' crews, who have been obliged to remain over night. From Tumpat Tuan to Oojong Kamarang (the point to the N.W. of Bancoongong Bay), the course is about S.E. 8 leagues, and a ship should keep $2\frac{1}{2}$ or 3 m. off shore, in 25 to 20 fathoms: when you raise the point, the small isle called Pulo Munkie, will be perceived, from which Pulo Dooa bears E. by S. about 5 m.

BANCOONGONG, or BAKOENGON BAY, about 4 $\frac{1}{2}$ leagues to the S.E. of Point Labon, where ships may lie sheltered from N.-Westers, has some rocks off its W. extremity: and there is a shoal on the edge of soundings, about 3 or 4 leagues to the S. The river and village of Bancoongong, in lat. $2^{\circ} 56' N.$, lon. $97^{\circ} 32' E.$, may be known by two small islands, about 6 m. to E. by S. of Pulo Munkie; the N.-most, called Pulo Dooa, or Duas, the other Pulo Kayoo, which have a safe channel between them of 10 and 12 fathoms, and are situated near the river's mouth; there is also a mountain close to the sea nearly as high as the others, which is formed like a saddle, with the highest end to the S., and Bancoongong lies close under its N. end, and 3 or $3\frac{1}{2}$ m. to the N.W. of the village of Sebadies. A large ship may anchor in 15 fathoms, soft ground, about $\frac{1}{2}$ m. off shore, with the entrance of the river bearing N.N.E., where she will be sheltered from N.W. winds: vessels sometimes touch at this place to trade, there being a river and village on the E. side of the point.

In approaching this place from the S., much care is requisite, as there are several shoals on which a ship would ground. To avoid these, bring Bancoongong Bazar to bear N. by W., and run in on this bearing till Pulo Munkie bears W.; you may then haul out more to the W. and anchor in from 14 to 15 fathoms, at $\frac{1}{2}$ m. off shore, with the bazar bearing N., and Pulo Munkie W. $\frac{1}{2}$ S. If bound from the N., the passage between Pulo Munkie and the main may be adopted, by keeping about $\frac{1}{2}$ m. from the latter, and standing along shore at that distance, till Bancoongong Village bears

from N. to N. by E., and anchor. Should the passage to the S. of Pulo Munkie be preferred, bring the opening between the two Pulo Duas to bear E., and run for it till Bancoongong Bazar bears N. by W.; and observe the same directions as given above for approaching these roads from the S.

There is a shoal a mile S.S.E. from Pulo Kayoo; and S.S.W. at 1 m. from it, stands **Campong Arra**, a small islet with a few cocoa-nut trees. Off the Village Sebadies, or Salekat, which lies E. 2 m. from Pulo Dooa, there is good anchorage in 12 fathoms, about 1 m. from the shore, sheltered from N.W. winds. If bound into this road, and being about 8 m. off shore in 25 fathoms, bring the Village Sebadies to bear N. by E., steer in with this bearing, and anchor in 10 or 12 fathoms, the village N. by E., and 1 or $1\frac{1}{2}$ m. off; but take care of a shoal near that position. Between Pulo Kayoo and the small Isle Campong Arra, nearly in mid-channel, lies a shoal, with $4\frac{1}{2}$ ft. on it; and another shoal E. $\frac{1}{2}$ S., from Campong Arra $\frac{1}{2}$ m., which always breaks. About $\frac{1}{2}$ m. W. by N. from Pulo Dooa, there is also a shoal.

Pulo Duas, or **Dooa Harbour** is the best amongst the Northern pepper ports, being well sheltered in 13 fathoms, with that island bearing W. about $\frac{1}{2}$ m. But according to the chart, there is a string of four shoals off this place, in an average S.W. by W. direction for 12 m.

Touroumang, or **Troemon**, in lat. $2^{\circ} 49' N.$, is 6 or $6\frac{1}{2}$ m. to the S.E. of Salekat, where a vessel may anchor: but W.N.W. $2\frac{1}{2}$ m. from it, there is a reef on which the sea sometimes breaks, having close to it 8 fathoms, water. In the vicinity of Touroumang Bay there are several dangerous shoals, one is in lat. $2^{\circ} 47' N.$, bearing from Pulo Dooa S.W. $\frac{1}{2}$ W. about 12 m.; and from this shoal the highest peak of a Saddle Hill (to the N. of Touroumang) bears E. by N.; this shoal has only 11 ft. water, with 30 fathoms close outside. The brig *Hammudy* struck upon it in the night, steering S.S.W. in 28 fathoms. There is said to be a shoal in 24 fathoms, bearing from Pulo Dooa S.W. $\frac{1}{2}$ W., distant 3 m.: one bearing N. by W. $\frac{1}{2}$ W. from Pulo Touroumang, distant about 2 m.; and another about W. by S. 2 m. from the same place.

Troemon, or Touroumang, now affords the largest quantity of pepper of any place on the coast. In approaching, care should be taken to avoid the shoal bearing N. by W. $\frac{1}{2}$ W. from it, on which the sea sometimes breaks, as it is only covered with 9 ft. water. The isle near the shore to the S. of the anchorage (Pulo Touroumang) should be brought to bear E.S.E., then steer towards it, and pass at a moderate distance round its N. end, from which a spit projects about half a cable's length. The anchorage is usually in 7 fathoms, sandy bottom, off the mouth of the river, but good ground tackling is requisite, it being exposed to the N.-Westers. Some vessels anchor under the island, although it is inconvenient to be so far from the mouth of the river. There is a passage to the S. of the island, which is seldom used, as a reef lies nearly S. about $1\frac{1}{2}$ or 2 m. from the island; but Captain Ross says this inside passage is safe, by rounding the point to the S. of Touroumang in 5 fathoms; and from thence the track close along shore, inside of all shoals, to Sinkell is safe, and preferable to the outside track by Passage Island.

Boelo-Sama Village, in lat. $2^{\circ} 34\frac{1}{2}' N.$, has opened a trade, where ships procure pepper, and the anchorage is in 6 or $5\frac{1}{2}$ fathoms; off shore about a mile, with Ojong Petecallo bearing S. by E., Tumpat Tuan Hill N.W. by N., and Baniak Peak S.W. $\frac{1}{2}$ W. There appear to be shoals at 3 or 4 m. to W. by N., and to N.W. of this anchorage.

COAST NAVIGATION FROM BANCOONGONG TO PADANG.

Directions. In sailing from the N., ships bound to Sinkel, or other ports N. of the Equator, ought to proceed by the Inner Passage between Pulo Baniak and the main, and near to Passage Island. The land between Bancoongong Bay and Cape Siteo is mostly low near the sea, and hilly inland. In coasting along, keep about 3 to 4 leagues from shore to avoid the shoals, and when Passage Island is seen, steer towards it. Within 2 or $2\frac{1}{2}$ m. of the main, when Baniak Peak is on with Passage Island, there is a rocky shoal, having only from 2 to 3 fathoms on it in some parts, with a safe channel of 8 and 9 fathoms between it and Sumatra shore. This channel, close along the coast, has depths of 8, 9, and 10 fathoms regular soundings within a mile of Cape Siteo; at times a small breaker is seen on the sunken rocks, which appear 2 m. distant from the Cape; and this passage is probably safer than the other between the shoal and Passage Island, because you may venture within $\frac{1}{2}$ m. of the shore. Captain Ross said, this Inner Passage is very safe; he adopted it from notice given in the *Cadogan's* journal, and had 12 fathoms, water, near to Ojong Petecallo, and from thence passed close along the coast to Troemon Road.

Passage Island, called Javoe Javee by the natives, in lat. $2^{\circ} 23' N.$, and 7 m. to the W. of Cape Siteo, or Ojong Petecallo, is low and sandy, with few shrubs; but one large Banian tree may be seen at a great distance, and the island discerned from the deck 4 or 5 leagues in clear

weather. It stands at the E. end of an extensive reef, between which and the Baniak Islands, there is another channel.

The Baniak Islands will be found described further on, at page 626.

THE CHANNEL between the coast of Sumatra and Passage Island is rendered intricate by the dangerous rocky shoals mentioned above, having only 2 and 3 fathoms on them in some places, and situated nearly mid-way betwixt the island and the main. Although there is a safe passage inside these shoals, by keeping close to Sumatra shore, yet the channel between Passage Island and the shoals has been usually adopted. In steering for this channel, keep about 3 leagues off the coast until Passage Island is seen, then steer towards it, observing never to bring it to the E. of S.E., to prevent getting near the shoals, projecting from its outside, one of which shoals is said to be 4 m. W.N.W. from the island. Bring it to bear S. by E., then steer S.S.E., and when $\frac{1}{2}$ m. off it, keep about the same distance in sailing along its E. side, but not more than $\frac{1}{4}$ m. from it, to avoid the shoals mid-way between it and Cape Siteo: on account of these, the island must be borrowed upon, but not under $\frac{1}{2}$ m., for the flat is dry all round to the distance of a cable's length at L. W., and projects about $\frac{1}{2}$ m., or rather more in some places, but not visible at H. W. Soundings will be tolerably regular, and the depths never less than 10 or 12 fathoms, mostly rocky bottom. When Passage Island is in one with the peak of Baniak, they bear S.W. by W. $\frac{1}{4}$ W., and it cannot be mistaken, there being no other island betwixt it and the main. A good look-out from the mast-head is requisite when passing through this channel, as the coral shoals may be discerned in clear weather, but the flat surrounding Passage Island cannot be always distinguished. When through the channel, which is about a mile in length, the island must be kept between N.N.W. and N.W. by N., in steering from it to the S., where a ship may anchor if the wind or tide be unfavourable; but to the N. of the island do not anchor under 20 fathoms, for the ground there is rocky under that depth.

Another Channel exists to the W. of Passage Island, by keeping near to Pulo Oujong Batoe and the other islands off E. side of Baniak, as several dangerous shoals extend $\frac{1}{2}$ channel over from Passage Island towards Oujong Batoe. Those who intend to adopt this channel in coming from the N., should never, in working, bring the S.-most island to the S. of S. $\frac{1}{4}$ E. in standing to the E. towards the shoals; if the water shoal suddenly, tack immediately, as the shoals are steep-to. The depths in this channel are irregular, from 17 or 18 to 33 fathoms, and it is about 2 m. wide in the narrowest part abreast the E. side of Pulo Sago, between some shoals that project about $\frac{1}{2}$ m. from the N.E. point of this island, and the other shoals which occupy the E. side of channel towards Passage Island. In proceeding through, a good look-out from the mast-head is proper to discover the shoals, not having been well explored; but several ships which trade to this coast have passed through it with safety.

SINKEL, or SINGKEL RIVER, in lat. $2^{\circ} 15' N.$, lon. $97^{\circ} 45' E.$, about 4 leagues to the S.E. of Passage Island, was formerly a place of considerable trade, the principal exports being benzoin, camphor, wax, and gold. A ship bound to this place should, after leaving Passage Island, steer about S.S.E. or S.E. by S., taking care not to bring the island to the W. of N.W. by N.; keeping 6 or 7 m. from the main; having brought the low point, covered with Palmyra trees, on the N. side of Sinkel River, to bear about E. by N., she may haul in, and anchor in from 12 to 17 fathoms, with the mouth of the river N.E., distant 1 m. Sinkel Road is inside the reef that lies to the S.E. of the river, and there is a shoal at 2 m. to the S. of the road. Breakers project a little way from the points that form the river entrance, and the town is some distance up; but when a ship is known to have anchored to trade, the merchants will come off to her. No person should be permitted on board, except the principal merchants, deprived of offensive weapons, and caution is requisite to repel or prevent any attack that the natives may be inclined to make. A snow, belonging to Bengal, was cut off here, but since that period much improvement in the character of the natives may have taken place; for the Dutch seem to keep them in subjection.

Se Leaga Bay, about 3 leagues E. from the mouth of Sinkel River, is sometimes chosen by ships trading to Sinkel, on account of its shelter. If bound into it, steer from Sinkel Point along the coast at a moderate distance to the W. point of the bay, taking care to avoid a shoal or rock, said to lie in 20 fathoms, S.W. from the island in Se Leaga Bay. Oujong Rajah, or Bawang, the W. point of the bay, has a long flat projecting from it about 2 m., which may be crossed about 3 m. from the shore in 8 or 9 fathoms, hard ground, and when the bottom becomes soft to the E. of it, haul up N.N.E., and pass on the West side of a low, sandy island, and anchor between it and the W. shore. If the ship is to remain a considerable time, she should run into 5 fathoms, mud, and anchor on the W. side the small island of Se Leaga, which is covered with trees, where she will be sheltered by the land from W. winds, and from S.E. winds by breaking reefs in that direction, at the entrance of the bay.

Outer Shoals. **Cahrang Daphne**, with 4 fathoms only, lying $7\frac{1}{2}$ m. to S.S.E. of Oujong Bawang, is the W.-most of several sunken rocks off Se Leaga Bay; and from the Daphne they extend to the E. 6 m., or more; indeed, the sea seems studded with these dangers right away to Baroos Road. Several islands and shoals are scattered along the coast from Singkel to Baroos, and there are some places on it, such as Bankole and Tapoos, frequented by the small trading-vessels. The land in this space is generally low near the sea.

PULO LACOTTA, in lat. $1^{\circ} 50' N.$, lon. $98^{\circ} 3' E.$, distant 10 leagues from Sinkel River, is a small, low island, covered with trees, having at 4 m. distant N. by W. from it, a low islet or sand-bank, in about 36 fathoms, water, called Bird Island, from being a place of refuge to the feathered race; it is not discerned farther than 3 leagues. A reef projects from it about 1 m. to the N.W. and S.E., and when it is visible to an eye at 15 ft. above sea, bearing S.E. 7 m. distant, and with Pulo Lacotta, S.S.E. $\frac{1}{4}$ E., there is a shoal with only 1 fathom, water, on it. With Bird Island W.S.W. 5 m., and Lacotta S.W. $\frac{1}{4}$ W., $5\frac{1}{2}$ m., there is a shoal with 11 ft., and from 30 to 25 fathoms around. The best track for vessels is exactly half-way between Pulo Lacotta and the main land, wherein you get from 26 to 33 fathoms, water. The dangers on the side of Lacotta lie within a radius of 8 m. from that island, and this Inner Passage has been somewhat sounded, whereas to the S. and S.E. of Lacotta, several shoals have been found.

Baroos, in lat. $2^{\circ} 1' N.$, is a place of some trade, the principal exports camphor and benzoin; fresh water may be procured, but it is dangerous for a ship's boat to enter the river, except with a native guide. Wood and water may also be got at Pulo Lassey, about 2 leagues to the N.W., near the W. point of Tapoos Bay, by anchoring under that island, with it bearing N.W. by W., distant about a mile. Approaching Baroos from Sinkel, a ship should steer out S.S.E. for 10 m. into 23 or 26 fathoms, then E.S.E. to pass between Bird Island and the main. The water deepens near these islands, but soundings are not regular, and there are plenty shoals within 6 m. of Bird Island: the best track to keep is from 26 to 30 fathoms, water. Great prudence is requisite to pass them in the night; this should only be done in clear, favourable weather, taking care not to borrow nearer the shoals fronting the coast than 27 fathoms, nor too close to Bird Island and Pulo Lacotta. Having passed inside them, haul in E. by S., and pass Pulo Carangua, a small island covered with trees, on the S. side, about 1 m. off: then haul up to E.N.E. and N.E., and anchor in Baroos Road in 10 fathoms, mud, with the flag-staff N.N.E. nearly 3 m. off, and Pulo Carangua, about W., 2 or 3 m.

Pulo Sokum is the first small island off the coast to the N. of Tappanooly Bay; you can pass either side, and anchor to E. of it.

The course from Pulo Carangua to Pulo Sokum, is S.E. by E. about 5 leagues; in sailing towards Tappanooly Bay, the channel between Moesalla and the main is from 2 to 3 leagues wide, with regular soundings, and good anchorage. There is a shoal of coral rocks, with 9 ft. water on it, 2 m. off the main, and another 5 m. off, surrounded by 16 and 20 fathoms, and the track is between them. **Battoo Barroo Point**, of considerable height, forms the W. extreme of Tappanooly Bay; the above coast-shoal is small, said to bear W.N.W. from Battoo Barroo Point, and lies in 9 or 10 fathoms, so that a ship should not come under 12 or 13 fathoms until near the point, which is distant about 4 leagues to S.E. of Pulo Sokum; she may then round the point in 9 or 10 fathoms, keeping it pretty close aboard, and the island of Ponchang Cacheel, the nearest island to the point, and known by its fort and flag-staff, will be seen to the N.N.E. This island may be passed on either side as most convenient, and after bringing it to bear about S.W., or the hill on which the colours are hoisted S. by W. $\frac{1}{4}$ W., and the E. side of Pulo Ponchang Gadang about S.E. by S., she may anchor in 7 or 8 fathoms, soft ground, about a cable's length from the island, and carry a hawser on shore to steady her, where she will be land-locked, and off the Dutch residency of Sibogha.

TAPPANOOLY, or SIBOGHA BAY forms an extensive harbour, subdivided into many coves or harbours by different islands, where ships may lie sheltered from all winds. **Ponchang Cacheel**, a little inside the entrance, where ships generally moor, is in lat. $1^{\circ} 43' N.$, lon. $98^{\circ} 47' E.$ Between it and Pulo Panjang, the next island to the N., there are 7 and 8 fathoms in a passage about $\frac{1}{2}$ m. wide. On the E. side of Panjang the harbour is spacious, the depths from 7 to 4 fathoms, with a watering-place on the main to the N.; there is also good shelter to the W. of Panjang, but reefs project from the N. end of it and adjoining shores, and also from the other islands beyond it, in the N. arm of the bay; there are safe passages and good shelter among them, in depths from 3 to 5 fathoms. The village of Tappanooly is at the N. part of the bay, about 4 m. from Ponchang Cacheel; from thence this extensive bay is continued to the W., by a narrow channel that opens into a large lagoon, with depths in it from 2 to 3 fathoms. **Ponchang Gadang**, on the E. side the entrance of the bay, is the largest island in it, and has some steep

hills covered with large timber; near the foot of these there are several springs of fresh water. The passage betwixt this island and Ponchang Cacheel is a mile wide, with 6 or 7 fathoms close to either island, and 10 fathoms in mid-channel; between these two islands and Pulo Seeroodoot, situated about $1\frac{1}{2}$ m. to the N.E., the depths are from 7 to 9 fathoms, regular soundings, and the channels safe. There is good anchorage near the N.E. side of Ponchang Gadang, in 7 or 8 fathoms, to the E. of an islet off its N. end, around which, and the W., the S., and E. sides of Gadang, a reef projects some distance. Sibogha Cove stretches into the land to the E. of Pulo Seeroodoot, having 4 and 5 fathoms, water, inside, and the same depths in the entrance, between the S. end of that island and the main land.

Tides. In Tappanooly Bay it is H. W. on F. and C. of moon, at 6 h., springs rise 6 ft.

Nassy See Tounkas, or Sugar Loaf, in lat. $1^{\circ} 35' N.$, a small conical island, about 500 ft. high, bearing S.S.W. 9 m. from Ponchang Cacheel, is the leading mark for ships bound out of Tappanooly harbour to the S.; it being conspicuous, and the S.-most island in the S. part of the great bay of Tappanooly, nearly midway between Batoo Mama (the S. extremity of the bay) and Moesalla. To the E. of the Sugar Loaf, betwixt it and Batoo Mama Point and Pulo Baccar, the nearest island to the N.E., there is an open passage, with soundings from 14 to 19 fathoms; but as a rock lies betwixt the point and Baccar, on the E. side of this passage, and from N.W. side of the latter, likewise from N.E. side of Sugar Loaf, reefs project about a cable's length, the passage to the W. is generally preferred. Departing from Tappanooly Harbour, a ship should steer about S.S.W. for the Sugar Loaf, which may be passed on either side; but the W. channel is the best, being nearly 5 m. wide, with regular soundings 22 and 23 fathoms from side to side; the Sugar Loaf being steep at the W. end, with 21 and 22 fathoms close to it. When abreast of it, a Southerly course should be steered until in 25 fathoms, observing not to bring it to the W. of N. till this depth is obtained, to avoid a shoal of coral rocks, said to lie to the S.E. of it about 3 or 4 m.

MOESALLA, MENSULAR, or MASSULAR ISLAND (the N. point being in lat. $1^{\circ} 42' N.$, lon. $98^{\circ} 30' E.$) is 11 m. in extent E. and W., situated to the W. of Tappanooly Bay: it is high, with several inlets on the N. side, and contiguous to its S.E. end there is a group of islets, which form a Harbour, with various depths in it from 22 to 14 fathoms, over a bottom of soft mud; between the entrance and the group of islands near it to the S., the depths are from 24 to 30 fathoms, in two safe channels leading from the E. and S.W. This harbour furnishes excellent fresh water, and the surrounding land of Moesalla and adjoining islands abound with poon spars, fit for masts or yards of any size required. It is H. W. at 6 h. on F. and C. of moon, the rise of the tide only about 4 ft. At the N.W. end of the island there is a considerable waterfall, which issues from a high hill. If a ship coming from the N., is not bound to Tappanooly, she may, after passing Bird Island, steer for the N.W. end of Mensular, and proceed along the W. side, a bold shore; but she ought not to stand far out, on account of shoals half-way between the S.E. end of Moesalla and Pulo Dooa.

Pulo Dooa, in lat. $1^{\circ} 28' N.$, lon. $98^{\circ} 12' E.$, are a larger and smaller isle, with some dangers near them, distant 5 or 6 leagues to the S.W. of Mensular; other dangers lie to the N., between them and Pulo Lacotta, which are avoided by keeping well to the E. after passing Bird Island. The *Claudine* struck on a reef extending about $1\frac{1}{2}$ m. E. by S. and W. by N., the Sugar Loaf bearing N.E. by E., about $5\frac{1}{2}$ or 6 leagues, the westernmost point of Mensular N. by E. $\frac{1}{4}$ E., and Pulo Dooa N.W. by N.; about a cable's length from it she had 38 fathoms, and only 11 ft. where she struck, which was within half a cable's length of a patch level with the water's edge, appearing to be the E. extremity of the reef. In a S.W. direction, at the same time, a very extensive reef of breakers was seen, with a rock above water 4 or 5 m. distant. The **Karang Kima Reefs** are in this neighbourhood, about lat. $1^{\circ} 20' N.$, lon. $98^{\circ} 20' E.$, and ships had better avoid this part, by keeping along the coast.

PULO NIAS, the large island, 50 m. to the S.W. of Moesalla, is described farther on.

Pulo Illy, an island near the main, about a mile in length, moderately high and even, bears from the Sugar Loaf about S. by E. $\frac{1}{4}$ E., distant 6 leagues; from 26 to 22 fathoms are good depths to preserve in coasting between them, and Pulo Illy may be passed in 18 or 20 fathoms, or farther off in 24 or 25 fathoms, distant from it 4 or 5 m. There is anchorage under this island, and it affords wood and good water. The **Success Reef**, on which the galley *Success* grounded, and had 35 fathoms close-to, lies about 7 leagues to W.S.W. of Pulo Illy.

The **ZELODY or SE-KLADI ISLANDS** which shelter Taboejong or Capechong Road, are 8 leagues to the S. of Pulo Illy; in passing along, 24 and 25 fathoms are good depths to preserve, and the outermost Zelody Island is $4\frac{1}{2}$ m. from the main, with 20 or 21 fathoms near it; a ship ought to give it a berth of 3 m., to avoid the shoals in its vicinity. There is anchorage and shelter for small vessels from N.-Westers under these three islands, with good water and cocoa-nuts upon them; but the coast between them and Cara-cara Point is generally avoided, as several shoals lie

at a considerable distance from it, with Pulo Se-Kladi and Pulo Capechong, two small islands, lying in the bight inside of them. **Taboejong village**, or Capechong, is on the N. side of the point, but the water is shoal off it, and vessels have to anchor under the lee of Pulo Taboejong or Capechong.

Outer Shoals off Natal. On the outermost and most dangerous of these shoals, having only 7 ft. water, and not always visible in fine weather, the *Syren* struck, distant $3\frac{1}{2}$ leagues S. $\frac{1}{2}$ E. from the outer Zelody Island. There is a passage inside of Syren shoal, with anchorage, by keeping in 14 and 15 fathoms, but that on the outside is preferable. To avoid it, a ship, after passing the Zelody Islands at 4 or 5 m. distance, should steer to the S., observing to keep the outer island to the E. of North, and not to come under 23 or 24 fathoms soft ground, until Cara-cara Point bears about E.S.E., which will carry her 2 or 3 m. outside of it, as the shoal lies in 20 fathoms water. A coral reef about 4 cables in circumference and $2\frac{1}{2}$ fathoms on it, was seen with Pinie Island bearing S. $\frac{1}{2}$ W., Goenong Karakara Hill N.E. $\frac{3}{4}$ N.; discoloured water was distinctly visible a mile to the N.E. of this reef. Two reefs were also found, the first in lat. $0^{\circ} 30' N.$, lon. $98^{\circ} 48' E.$, with Karakara E. by N. $\frac{1}{2}$ N., Oujong Toeian S.E. $\frac{3}{4}$ E.; the second, Karang Lawe, had heavy rollers on it, about lat. $0^{\circ} 52' N.$, lon. $98^{\circ} 22' E.$, this is about 8 leagues to the E. of Pulo Nias.

NATAL BAY has in it many dangerous shoals, the outermost of them extending nearly 2 leagues off shore into 17 or 18 fathoms water, which renders great care necessary in sailing to or from the anchorage, for many ships have struck on these shoals. The **Karang Bayam**, or *Royal Bishop* Shoal is small, with only 12 ft. on the shoalest part, and has 17 fathoms $\frac{1}{2}$ m. off it; Cara-cara Point bears from it N.E. $\frac{1}{2}$ N., Natal Flag-staff E. $\frac{1}{2}$ S., and Pulo Tamong S.S.E. $\frac{1}{2}$ E. From another shoal, the Karang Tete, having on it 13 or 14 ft. coral, Cara-cara Point bears N. $\frac{1}{2}$ E., Natal Flag-staff E. by N. $\frac{1}{2}$ N., and Pulo Tamong S. by E. $\frac{1}{2}$ E., but **Karang Kapal**, with only 6 ft., lies 1 m. to W. of the last, with Natal Hill about E. by N., distant 5 m. The *Shaftesbury* Reef, on which the ship of that name was lost, lies farther in, on the E. side of the channel, and Natal Flag-staff bears from the W. end of it E. by N. $\frac{1}{2}$ N.

Cara-cara Point. Cara-cara Shoal, 6 ft. coral rock, on the N. side of the channel, bears from Shaftesbury Reef N. by W. nearly 3 m., being situated about $1\frac{1}{2}$ m. S.W. $\frac{1}{2}$ S. from Pulo Cara-cara, the small island near shore to the E. of Cara-cara Point. There are other shoals, the positions of which are given on the Admiralty chart. Ships coming from the N., bound to Natal Road, after Cara-cara Point bears about E.S.E., in 19 or 20 fathoms, may steer to round it at 3 m. off, by keeping Natal Flag-staff between E. by S. and E. by S. $\frac{1}{2}$ S., which will carry them nearly in mid-channel between the Shaftesbury and Cara-cara Shoals; they may continue to steer direct towards Natal Hill until near the road, then edge a little to the S., and anchor with the Flag-staff E. or E. by N.

Ships coming from the S., may pass either inside or outside the *Royal Bishop* Shoal; but there is a more dangerous shoal, with 6 ft. **Karang Laut**, which is 4 m. to S.S.W. of the other; if they keep in 13 or 14 fathoms soft ground, they will pass inside of it, or by keeping in 19 fathoms it will be passed on the outside: then after bringing Natal Hill or Flag-staff about E. by S., but never to the S. of E. by S. $\frac{1}{2}$ S., when in 14 fathoms, they may steer in for the road as directed above. To pass between Karang Laut and Karang Kapal, steer up in 12 or 13 fathoms, keeping the S.W. point of Pulo Temang on with Oujong Toeian Point (7 m. to S.S.E. of the other), till the hill, Goenong Karakara, being just over Pulo Cara-cara, bears N.E. by N., then steer for it till Natal Flag-staff bears about E.

The Anchorage is from 5 to 6 fathoms, with the Flag-staff E. to E. by N., and nearly in a direct line between Cara-cara Point and Racatt Point, which bear about N.N.W. and S.S.E., from each other, the latter forming the E. side of the anchorage; and in this station the distance from Racatt Point will be $1\frac{1}{2}$ or 2 m. and from Natal $2\frac{1}{2}$ or 3 m. So long as the centre of Natal Hill bears between E. by S. and E. by S. $\frac{1}{2}$ S. by compass, a ship will pass into the road with safety. A ship should not approach nearer than 3 m. to Cara-cara Point and Island, to avoid the shoals that lie off the island; and when the point bears N. by W., she will be within the shoals, and may then edge away gradually to the S., until Natal Flag-staff bears E. by N., then anchor in 6 or 5 fathoms, but not under the latter depth in a large ship. Racatt Shoals with heads having only 2 fathoms to 5 ft., coral bottom, extend for more than 3 m. to the W. by N. off Racatt Point.

Natal Town is in lat. $0^{\circ} 32\frac{1}{2}' N.$, and lon. $99^{\circ} 8' E.$ Camphor, benzoin, and gold-dust are the principal articles of export; the imports, opium, iron in flat bars, salt, piece-goods of various kinds, stick-lac, gunpowder, &c. But the road is one of the worst on the coast, being much exposed to N.W. and Westerly winds. Natal Hill, situated on the N. side of the river, appears like a gunner's quoin when it bears S.E. by E., and may be known by its barren aspect, and having low land on each side; when seen, it ought to be kept open with Cara-cara Point, to avoid the shoal, and if not bound into Natal, keep out in 21 or 22 fathoms in passing the shoals that front the bay.

Pulo Temang, or Tamong, $8\frac{1}{2}$ leagues to the S. of Natal Road, and near the coast, has good

anchorage in 8 or 9 fathoms, between it and the main. Small vessels, bound from Natal Road to the anchorage at Pulo Tamong, sometimes pass inside the shoals, keeping near Point Racatt and Durian Point, a little to the S. of the road, taking care not to deepen above 6 fathoms, till past the latter point, on account of two shoals, that lie out in 7 and 8 fathoms. It is best, in a large ship, to steer out to the W. through the proper channel into 13 or 14 fathoms, and preserve this depth until Pulo Tamong is brought to bear S.E., or E.S.E.; she may then steer for the N. part of that island, and rounding it, anchor with the body of it bearing about W. in $6\frac{1}{2}$ or 7 fathoms, distant $\frac{1}{2}$ m. from the shore. The well containing good water is then abreast, on the low land near a small, white, sandy beach; fire-wood may also be got, and a ship is sheltered from Westerly winds. There is a safe passage betwixt the S. end of island and the main. Small ships coming from the S., intending to enter Natal Road by the inner passage, may pass in mid-channel between Pulo Tamong and the main, in 6 to 8 fathoms. When through, the course is N. by W. and N. $\frac{1}{2}$ W. for Durian Point, observing not to come under 9 fathoms, in passing about mid-way between it and Pulo Tamong, on account of a shoal of coral rock with 10 and 11 ft. water on it, which lies in 7 or 8 fathoms. When Durian Point (the S. end of Racatt Point) bears E., you may borrow into 5 or $5\frac{1}{2}$ fathoms; and in steering the same course towards the road, do not exceed 5 fathoms, in passing Racatt Point at $\frac{1}{2}$ m. off, on account of shoals that lie off in $6\frac{1}{2}$ to 8 fathoms. The snow *Marlbro'* struck and beat off her rudder on one of the shoals, with Racatt Point E. $\frac{1}{2}$ S.

If bound to Ayer Bongy from the anchorage under Pulo Tamong, steer about S.S.W. between the main and the island in 5 and 6 fathoms, soft ground, keeping rather nearest to the latter from this island to Ojong Lalloo, the W. point of Ayer Bongy Bay, pass inside the shoals, by steering S. along the coast in 9 or 10 fathoms, till Ojong Lalloo* Point bears E.S.E., then haul up for it, to avoid the outer shoals; the shore is safe to approach to $5\frac{1}{2}$ or 6 fathoms. Great care is requisite in passing Ojong Lalloo, for several shoals front this part of the coast, the situations of which are imperfectly known. The ship *Sylph* beat off her rudder upon one of them, with the outer extreme of Pulo Tamong bearing N.N.W., and Ojong Lalloo N. by W. 2 or 3 m. distant. Most of these shoals are from 2 to 4 m. off Ojong Lalloo, and bear between S. by E. and S.S.E. from Pulo Tamong. There is a passage inside all of them, by keeping within $1\frac{1}{2}$ or 2 m. of the main, in from 4 to 6 fathoms, soft ground, when passing Ojong Lalloo and the two next points to the S.E., then proceeding between Pulo Panjang and the main, to the anchorage under that island. This passage seems improper for large ships; and vessels of every description, by whatever channel they enter Ayer Bongy Bay, must keep a good look-out for the numerous shoals.

The **BATOA ISLANDS, PULO PINIE, and SIBEROET**, will be described farther on.

AYER BANGIES, or AYER BONGY BAY, $5\frac{1}{2}$ leagues to the S.E. of Pulo Tamong, has several fronting islands and shoals. Ships not intending to touch at Ayer Bongy should keep well out in 26 to 30 fathoms, water, after passing Pulo Tamong, or nearer to the islets and shoals off the E. end of Pulo Batoa than to the main, to avoid a shoal or bank, with irregular soundings from 16 to 4 fathoms, coral, on it, or probably less, and close to it 20 fathoms; which lies about $2\frac{1}{2}$ leagues S.W. from Pulo Tamong, nearly mid-way betwixt the main of Sumatra and the islets off the E. end of Pulo Batoa. Steer W. by S. from Pulo Tamong, till the E. end of large island Pulo Pinie bears S.S.W.; then, being in the fair track, steer S.S.E., till the N. side of Pinie bears W. $\frac{1}{2}$ S.; then (to avoid a shoal 11 m. due E. of Pinie), haul up E. for Pulo Panka. There are three small islands off the S.E. end of Pulo Batoa, and a dangerous shoal, with rocks above water, about 7 m. distant from the islands.

Pulo Panjang, in lat. $0^{\circ} 11' N.$, lon. $99^{\circ} 19' E.$, is the largest island in Ayer Bangies Bay. Pulo Tanca, or Begaga Islet, lies near Ojong Lalloo, betwixt which and Pulo Panka, or Pancel, situated about a league S. from the former, the passage is safe, and the depths 10 or 11 fathoms, soft bottom; the passage into the bay is also safe to the E. of Pulo Pancel, between it and Pulo Teller, situated 4 m. to E. by S.; and there is also a channel with 6 and 7 fathoms, betwixt that island and Ojong Sikabouw, or Sawang Poeding, the S.E. point of the bay; but there is a shoal, lying S. of that point, and bearing E. by S. $2\frac{1}{2}$ m. from Pulo Teller; and to the N., about 1 m. from Pulo Teller, there is a reef with breakers, which requires care in passing that island. A ship having entered by the most convenient passage, may steer for Ayer Bongy flag-staff on a bluff point or hill at the E. part of the bay, close to the N. end of which is the river and landing-place.

The anchorage is abreast the river, bearing E. by N., distant about a league, in $4\frac{1}{2}$ or 5 fathoms, good ground, under Pulo Panjang, the largest island in the bay, having a reef with breakers to the N.E. of it about a mile. Betwixt this island and Pulo Begaga, a small island to the W., there is a clear passage; and also one between Begaga and the point of the main to N. by W. of it.

* Formerly marked on charts as Lubwaun Looloo, now called Gonong Bagomba.

Shoals. To the S. of Ayer Bongy S. point, which is of bluff appearance, there are several shoals; ships, bound from that anchorage to the S.E., generally keep inside near the coast until clear of them. These shoals bear E. by S. from Pulo Tello, three in a line; the E. most distant from it about 7 m. There are others about 6 to 9 m. to the S.E. of that island. H. M. S. *Drake* struck on **Karang Poelo Tello**, a small coral shoal, with the peak of Mount Ophir E. by N., Pulo Tello due N., and Lalloo Point N.W. $\frac{1}{2}$ N., off shore 3 leagues, having close to it 23 fathoms, soft mud. To the S. of Ayer Bongy Shoals there appear to be other shoals in the offing abreast of Passamane Bay; one of which, about 2 cables in diameter, is thought to have 3 fathoms, water, on the shoalest part, with 21 and 22 fathoms close to it all round; the *Prince Henry* got on it, and saw the rocks alongside, with Oojong Seecarboa (or perhaps Ooojong Toean) bearing N. by W. $\frac{1}{4}$ W., the largest of Oojong Massang Hills E. by S., the trees on the low land just visible from the deck, distant about 5 leagues. This shoal, consisting of black coral, is not easily discerned. In the *Luconia*, high breakers were seen on another shoal, bearing about S.W. by W. from Oojong Massang, which was thought to be about 6 leagues off shore, but Captain Bennet thinks it lies 8 or 9 leagues from the shore. With the largest of the Massang Hills E. by N., there is said to be a shoal with breakers about 5 m. off shore, in 15 or 16 fathoms, water.

There seems, indeed, to be a string of dangerous coral reefs, standing up out of 40 fathoms, water, between Pulo Pinie and Padang.

Mount Ophir, in lat. $0^{\circ} 4' N.$, lon. $100^{\circ} 0' E.$, about 9,460 ft. high, situated $5\frac{1}{2}$ leagues inland, appears like an obtuse cone by itself, separated from the chain of other mountains, and seen 110 m. in clear weather, it being the highest mountain on Sumatra visible from the sea. A volcanic mountain (Singalang) 11 leagues to the S.E. by S. of Ophir, and 7 leagues inland, is 9,600 ft. above the sea, in lat. $0^{\circ} 22' S.$

Passamane Village is exactly on the Equator, and 24 m. to E.S.E. of Pulo Panjang. A breaking reef, called Gossong Satoc, lies 12 m. due W. from Passamane.

Oojong Massang Point, situated in lat. $0^{\circ} 19' S.$, lon. $99^{\circ} 49' E.$, and 13 leagues S.E. by E. from Ayer Bongy Bay, has a reef of foul ground stretching out about 2 or $2\frac{1}{2}$ m., which should not be approached under 17 fathoms, and near the point are the three Massang Hills, the middle or largest having a tabular form, and the others resembling haycocks. Between this place and the S. point of Ayer Bongy Bay (which is of middling height) the coast is low, and forms the Bay of Passamane. If a ship departing from Ayer Bongy Road intend to proceed to the S. inside the shoals, where the lead is a good guide, and the anchorage safe, she ought to keep in from 5 to 8 fathoms, within 2 m. of shore until abreast of Oojong Seecarboa, (Sikabouw) and pass this point about 1 m. off; then, in daylight, borrow towards the shoals to 12 fathoms, but not under 9 fathoms towards the main, after the point bears about N.N.E., when turning to windward. When 3 leagues to the S.E. of Pulo Tello, she may stand out to 15 or 16 fathoms, and keep in these depths, or steer a course for Oojong Massang, without hauling into Passamane Bay under 12 fathoms, or approaching too near the shoals in the offing, observing not to come under 17 fathoms in passing Oojong Massang. From Massang to the S.E., for about 70 m., shoals (whose positions are uncertain) lie from 4 to 8 leagues off shore.

To pass outside the dangers, after being clear of the shoal 3 leagues S.W. from Pulo Tamong, a ship ought to keep well out in 25 or 26 fathoms, gradually rounding the shoals off Ayer Bongy; having cleared these, she should haul to the E. to make Oojong Massang Hills, and round that point at 3 m. distance in 17 or 18 fathoms, then keep in 17 to 20 fathoms for the outer Ticoo Island, observing to round it on the W. side within a mile in 16 or 17 fathoms. A ship departing from Ayer Bongy Bay should, if this passage be adopted, sail out between Pulo Pancal and Pulo Tello, then steer from the latter for 20 m. to S.S.E., until in 21 or 22 fathoms, when Oojong Massang will bear S.E. by E. 20 m.; and not come under 20 fathoms until near that point; a good look-out is necessary for the 3-fathom shoal of the *Prince Henry*, mentioned above.

TICOO ISLANDS, distant about 3 leagues to the S.E. of Oojong Massang, are three in number, small and woody, about $\frac{1}{2}$ m. apart, and the innermost is $\frac{1}{2}$ m. from the main. The proper channel is within a mile of the W. and S. sides of the outer island, in 15 to 17 fathoms, to avoid a shoal bearing from it about S.W. 4 m., in 25 fathoms, over which the swell may be seen to roll when it is abreast, if there is much sea; another shoal lies S.W. about 5 leagues from the outer Ticoo Island, no ground 50 fathoms near it. Should night be approaching, a ship may anchor in 9 or 10 fathoms, with the outermost island bearing W., distant about $\frac{1}{2}$ m.

Outer Ticoo Island, in lat. $0^{\circ} 25' S.$, bears S.E. $\frac{1}{2}$ S. from Oojong Seecarboa (Sikabouw).

In coming near these islands from the S., breakers appear, which seem to deny any passage among them; but betwixt the inner and middle islands there is a safe channel on either side a small coral bank, about a cable's length in diameter, situated about $\frac{1}{2}$ m. from the innermost, and

about $\frac{1}{2}$ m. from the middle island. It is steep to all round, with 7, 8, and 9 fathoms betwixt it and the middle island, but the passage on this side is much contracted by a spit projecting nearly 2 cables' lengths from N.E. end of island. This passage between it and the inner island has good room for anchoring occasionally, with soundings $6\frac{1}{2}$ and 7 fathoms near the small bank, to 6 and 5 fathoms close to the island, over a soft bottom. From the S. end of the inner island a shoal stretches out nearly $\frac{1}{2}$ m., with $5\frac{1}{2}$ fathoms, soft ground close to, which must be avoided by a ship adopting the inner channel, just described. To the S. of the middle island, distant about $\frac{1}{2}$ m., the sea breaks on some rocks, to which a proper berth must be given, in ships that run under these islands for shelter from N.W. winds. To the S. of Ticoo Islands there are several shoals; and well out in the offing many others lie scattered from hence to the S. of Priaman, which may be considered the most dangerous part of the coast.

Pulo Cassey, or Kassi, in lat. $0^{\circ} 37' S.$, bearing about S.E. $5\frac{1}{2}$ leagues from the Ticoo Islands, is covered with trees, very small, with a sandy beach, and 2 m. from the main. The passage in this track, inside the principal shoals, is generally considered the best, by keeping in from 16 to 12 or 10 fathoms, and the coast is safe to approach to 6 or 7 fathoms in many places. Some navigators state that there are no shoals under 16 fathoms on this part of the coast; others assert that some shoals are situated near it in 5 or 6 fathoms. The best guide, therefore, is after leaving the Ticoo Islands, to keep in soft ground from 16 to 10 or 11 fathoms; for the bottom is all soft, except when near the shoal. The coast from the Ticoo Islands to Pulo Cassey is a little hilly, and lies about S.E. A shoal flat projects out nearly 2 m. in some places, on which the depths decrease regularly to 5 fathoms about 2 m. off shore. Exclusive of the shoal to S.W. of the outer Ticoo Island (already mentioned) others, bounding the passage on the W. side, are, one bearing about S.S.E. from the outer Ticoo Island, and nearly N.W. by W. from Pulo Cassey; when the breakers on it bore from W. to N.W., distant about 2 m., the depth was 16 fathoms; another, on which the sea sometimes breaks, bearing about S.E. by S. from the outer Ticoo Island, and nearly N.W. by W. from Pulo Cassey, with 20 fathoms close to its E. side; and there is one, with 3 fathoms, bearing S.S.E. from outer Ticoo Island, and N.W. $\frac{3}{4}$ W. from the N.-most of the three Priaman Islands, being that nearest to Pulo Cassey. Betwixt some of these shoals there are safe channels; the *Duke* had no ground 35 fathoms in passing between two of them, about 5 leagues S.S.E. from the Ticoo Islands.

Shoals outside Ticoo Islands. A string of dangers is marked on the chart, commencing at 9 m. to S.W. of the Outer Ticoo, with the **Gossong Dosa**, or **Haai Reefs**, in lat. $0^{\circ} 30' S.$, lon. $99^{\circ} 47' E.$, having 15 ft. on it, and 40 fathoms all round. Selita and Lawe Shoals bear S.E. from the above, Lawe being 9 m. off. The fair channel lies about a league inside these shoals, or 7 m. off the main-land, until you are to the S. of the Priamans.

THE PRIAMAN ISLANDS lying about $1\frac{1}{2}$ m. off Priaman settlement on the main, afford shelter from N.W. or W. winds, and the N.-most one, **Pulo Anso**, has on it a well of fresh water, where ships are supplied. From this the middle island is distant about 1 m. to the S., with 6 fathoms water in the channel between; but a reef projects about 2 cables from the W. part of the N. island, having close to it 7 fathoms. The channel inside the N.-most island, having only $3\frac{1}{2}$ fathoms near the island, and decreasing gradually towards the main, is only fit for small ships. From the middle island, the S.-most one, **Pulo Onjong**, is distant 2 m. to the S.S.E., and each of them is about 2 cables across.

Several Shoals lie about 2 or 3 m. to the W. of these islands, on which the sea breaks in bad weather, having 14 or 15 fathoms near them; but betwixt them and the islands the passage is safe, by keeping near the latter, in from 10 to 6 or 7 fathoms. **Karang Dorien** (with 13 ft.), the N. most of this group of shoals bears S.W. by W. from Pulo Cassey 2 or 3 m., with a safe channel betwixt it and that island, with depths of 12 or 14 fathoms. On the E. side of Pulo Cassey there is also a safe channel, with 6 fathoms near the island, decreasing regularly from 5 fathoms, about $\frac{1}{2}$ m. from it, to 3 and 2 fathoms about $\frac{1}{4}$ m. from the main. To the N.N.E. of this island, more than half-way to the main, there are said to be some rocks, with 4 fathoms outside of them.

Priaman (the Flagstaff), in lat. $0^{\circ} 40' S.$, bears nearly S.E. $\frac{1}{4}$ E., $3\frac{1}{2}$ m. from Pulo Cassey; the river is small, and the entrance so shoal, that a pinnacle cannot go in until near H. W., and even then not without danger. A little way out from the mouth of the river there is a bank, having on its N. and S. ends two patches of sand above water: within it there are 2 fathoms, sandy bottom. If you intend to proceed by the inner passage from the Ticoo Islands to Priaman, after having steered along the coast in from 16 to 8 or 10 fathoms, you may, when Pulo Cassey is approached, pass on either side of it, as the wind permits, then steer betwixt the middle and N.-most Priaman Islands, and anchor inside, under shelter of them.

If bound to Padang, continue to keep near the W. sides of the Priaman Islands in passing.

avoiding the Gossong Sibarat, a breaking reef lying $\frac{1}{2}$ m. to S.W. of the S. island; and steer along the coast at a moderate distance until Pulo Sow is approached, there being no danger in this part. There is a channel inside that island, but it is advisable to pass about $2\frac{1}{2}$ m. outside, to avoid a shoal said to lie S.W. from it; when clear of this shoal, a direct course may be steered for Padang Flag-staff, or for the anchorage under Pulo Pisang, should unfavourable weather be apprehended, where ships are sheltered from N.W. and W. winds, this being the proper road. **Pulo Sow**, called also Pulo Carong, distant about $1\frac{1}{2}$ m. from shore, and $2\frac{1}{2}$ leagues to N.W. of Padang Head, is small, with a reef projecting from its S. end about $\frac{1}{2}$ m.: a shoal is said to lie S.E. from it, and another to the S.W., stretching out a great way.

Pulo Ayer, one of the Padang Islands, bears W. by S. 6 m. from Pulo Sow; and **Pulo Bando**, the N.-most of the Padangs, bears N.W. by W. 14 m. from Pulo Ayer, and is 9 m. to S.W. of the Priamans.

The seven **PADANG ISLANDS** lie in the offing, and have several dangers amongst them. **Pulo Thoren**, in lat. $1^{\circ} 4' S.$, lon. $100^{\circ} 12' E.$, is the S. and largest one, being $\frac{1}{2}$ m. across. To the S.S.E. 3 m. off, lies **Bellona Rock**; and at 6 m. due S. of Thoren, lies the **Karang Laeet**, a sunken reef, which is 9 m. to N.W. of Pulo Muskitto.

Pulo Pisang, the island that affords shelter to Padang Road, ought to be reckoned among the Padang Islands. **Pulo Sato**, or **Siboutar**, is small, high, and flat, distant about 7 m. W.N.W. of Pulo Pisang, and has a reef off its N.E. point about a mile, or rather an island just forming, called Pulo Passier. **Pulo Dua**, or **Bindalong**, is a little larger than Sato, and lies to the S.W., having a safe passage between them. **Pulo Teega**, or **Thoren**, about 4 m. to the S.S.W. of Dua, and 3 leagues to the W.S.W. of Pisang, is the largest of these islands; breakers and foul ground stretch from it a great way to the N.E., nearly shutting up the passage betwixt it and Pulo Dua, which is thought to be dangerous. The *Marlboro'* reported a sandy patch above water, surrounded by a reef, at 3 m. E. by N. from Thoren. **Pulo Ampat**, or **Pandang**, about the size of Dua, lies to the W., bearing from Pulo Ayer, S.W. **Pulo Leema**, or **Ayer**, is a small inner island, bearing about N.W. 11 m. from Pulo Pisang; a reef is said to project from it about 2 m. to S.W.; another to lie E.S.E. 2 m. from it; but on the N. side it is clear, and there is thought to be a safe passage betwixt it and Pulo Sato. **Pulo Annam**, or **Pie**, bearing from Pulo Leema W. $\frac{1}{2}$ S., is of considerable size, and appears the N.-most island in coming from the S., as Toojoo is not then in sight; to the N., and also betwixt it and Ampat, there are said to be shoals.

Pulo Toojoo, or **Bando**, in lat. $0^{\circ} 47' S.$, lon. $100^{\circ} 2' E.$, the N.-most of these islands, is nearly the size of Annam, and bears S.W. from the Priamans. A coral bank bearing N.W. by W. about 3 leagues from it, should be approached with caution, for it is steep from no ground to 5 fathoms, and there may be less water on it. Close to, and amongst all these islands, the water is deep, and there is no good anchorage.

PADANG HEAD, in lat. $0^{\circ} 59' S.$, about lon. $100^{\circ} 22' E.$, having on it the flag-staff, is a high bluff headland, with a rock close to it called the Whale, and forms the S.W. side of the river's entrance; about a mile up on the N. bank, the fort and town are situated, but there are also houses and gardens on the opposite side. Bullocks, poultry, various fruits, and vegetables, may be got here at moderate prices; and excellent water, issuing from rocks on the S. side of river, is conveyed in spouts to boats. The river is only navigable by boats or small vessels in fine weather, the depths at L. W. being 8 and 9 ft. at entrance, and from 9 to 14 ft. a little way inside, and the rise of tide is about $2\frac{1}{2}$ ft. on the springs. It is very dangerous to enter the river when the wind blows strong at W. or N.W., for the sea then breaks entirely across the entrance, and a continued breaker extends from Padang Head to the S.W. point of the shoal that stretches nearly from it to within $\frac{1}{2}$ m. of the N. end of Pulo Pisang. This place is in possession of the Dutch, from which gold-dust, benzoin, and other articles are exported, in exchange for opium, blue and white cloth, and other piece-goods.

In approaching it from the offing, the head will easily be known by its bluff aspect, and the coast to the S. being all bold high land; whereas, the sea-shore to the N. of the river is low, and all the coast is low from thence to Priaman, but far in the country the land is generally high. A ship arriving when the weather is favourable, and intending to remain a little time, may anchor in 12 or 13 fathoms, soft ground, with the flag-staff bearing E. $\frac{1}{2}$ N. or E., distant from the bluff headland $1\frac{1}{2}$ or $1\frac{1}{4}$ m. If the weather is threatening, or the stay to be 3 or 4 days, it will be prudent to proceed to the proper road, under Pulo Pisang.

Pulo Pisang, about $1\frac{1}{2}$ m. S. by W. from Padang Head, is a small island, about $\frac{1}{2}$ m. in diameter, where water may be got by digging wells 4 or 5 ft. deep at the foot of the hills; the water, although soft and pleasant to taste, is said to be impregnated with saltpetre, and not very wholesome: the firewood is also indifferent. The rocky coral bank, stretching about 40 yards from this

island, is steep to all round, and at the E. part there is a wharf for the convenience of landing. Ships trading to Padang moor close to the E. and S.E. sides of the island, sheltered from N.W. and Westerly winds. When these winds prevail, boats cannot pass between Padang River and the ships under Pulo Pisang, on account of the breakers stretching across the passage. All round Pulo Pisang there is a safe passage of 6 and 7 fathoms, but it is narrow betwixt the N.E. end of island and the extensive shoal bank that occupies most of the space between it and Padang Head, on which are only $2\frac{1}{2}$ and $2\frac{1}{4}$ fathoms hard sand; this passage is not above 2 cables wide, and seldom used by large ships. The deepest water is close, or near to Pulo Pisang; a ship, to enter by the N. channel, must bring the island well to the E.-ward, and round the N. end in 7 or 8 fathoms about the distance of a cable's length or little more: the water will shoal as she runs in, to 6 and 5 fathoms, which is the least near the island; but towards the main, and Pulo Pisang Kecheel, or Little Pulo Pisang, lying near it to the E., the depths decrease to 4 and 3 fathoms hard sand. Having rounded the island close, and brought the wharf to bear W. by N., or W.N.W., she may moor in $5\frac{1}{2}$ or 6 fathoms, about 2 cables from the island. Large ships should always use the S. channel in proceeding to the anchorage under Pulo Pisang, rounding the island from the S. side about $\frac{1}{2}$ m. off; after bringing the body of island to bear about N.W. by W., they may anchor and moor in 5 or $5\frac{1}{2}$ fathoms mud, about 2 cables from it, where they will be sheltered from W. winds.

Sailing from the Ticoo Islands to Padang, if not intending to touch at Priaman, ships frequently pass outside the Priaman Islands and shoals, which is by some persons thought the best route. If adopted, keep in from 16 to 12 fathoms until within 5 or 6 m. from Pulo Cassey, then steer out to S.W., betwixt the shoals to the W. of that island and those to the S. of the Ticoo Islands, until in 35 or 40 fathoms, and from hence steer to the S. for Pulo Bando; after passing near it on the E. side, steer to pass Pulo Ayer and Pulo Sato, also on the E. sides, and from thence to anchorage under Pulo Pisang. If the wind be contrary, a ship, in working inside of these islands, ought not to borrow towards the main in the bight to the S. of Pulo Sow, where there is said to be a shoal; nor too near the other shoal, to the S.W. of that island.

The outer passage, from Natal to Padang, seems preferable to any other with a fair wind; but as the current usually runs with the wind, this passage is not convenient in contrary winds, particularly when bound to the N., being destitute of anchorage. If this route be chosen, at passing Pulo Tamong, keep well over towards the islets off S.E. end of Pulo Batoa, to avoid the bank, nearly mid-way betwixt them and the main: having brought them to bear about N.W., steer to fall in with Pulo Bando, and passing to the E. of it, of Pulo Ayer, and of Pulo Sato, steer for the anchorage under Pulo Pisang, as directed above; or if it seem preferable with the prevailing wind, you may steer to the S., outside Pulo Bando, Pulo Annam, and Pulo Pandang, then to the E. betwixt Pulo Dua (Bindalong) and Pulo Sato (Siboutar), keeping near to the latter in passing, to avoid the 2-fathoms shoal that lies about 4 m. S. by E. from it, and from Pulo Pisang W. by S. 2 leagues. From Pulo Sato, steer direct for the anchorage under Pulo Pisang. It would be imprudent to attempt to pass betwixt Pulo Dua and Pulo Teega, (Thoren) for the rocks stretching across seem to deny any safe passage.

If bound to Moco Moco, and not to touch at Padang, continue to keep outside of all the Pandang islands, between which and the chain of large islands in the offing there is a safe channel, from 10 to 12 leagues wide; but it is well to keep about 3 leagues outside of Pulo Bando and the others, as the **Stort Shoal** ($3\frac{1}{2}$ fathoms) lies 7 m. to W. of Pulo Pie; and the **Karang Laoet** lies 3 leagues to N.W. of Pulo Muskito. It will be proper to keep nearest to the inner islands, and make Idrapour Point, to prevent being driven leeward when Northerly winds prevail.

When bound S., from Pulo Pisang, steer for Pulo Seronda, or Bobeck, bearing from it nearly S., distant 8 m.; taking care, with a working wind, to keep Pulo Pisang to the N. of N.N.W. in standing towards the Rock off Boongas Bay. When near Pulo Seronda, she may steer about S.S.W. to pass off the W. sides of Pulo Bintango, and Pulo Marra (the next islands to the S.), and on either side of Pulo Muskito, a small island in the offing, distant about 3 leagues S. by W. $\frac{1}{2}$ W. from Pulo Seronda. There is also a narrow but safe passage inside these islands, having soundings from 20 to 36 fathoms, and generally adopted as the best: the only known danger is a shoal near $\frac{1}{2}$ m. E.N.E. from Pulo Oolar, a small island about mid-channel between Bintango and Marra. Betwixt the shoal and a spit projecting from the N. point of Pulo Oolar, there is a safe passage, and it lies rather nearer to the E. islands than to Pulo Oolar; but the channel outside of Pulo Oolar, between it, Bintango, and Marra, is clear of danger.

Being bound from Pulo Pisang to the S., and wishing to run out speedily clear of the islands into the open sea, a ship may steer to the S.W. to pass close on the N.W. side of Pulo Senaro (hereafter mentioned), betwixt it and the reef that is always visible; observing, when the island is

approached within 2 m. on the N. side, to give a berth to the 3-fathoms shoal, by edging a little to the W., and avoiding a direct line that passes through Pulo Pisang and Padang Head, which also passes through the shoal. To pass out to the S. of Pulo Senaro, when distant 2 m., it should be brought to bear S.W. by W., or W.S.W.; a direct course, about S.W., may then be steered to pass close to its S. point; and the same course, continued about 2 or 3 m. beyond it, will carry a ship clear of the two shoals mentioned to the S.E. and S. The *Maribro* struck on a shoal, with only from 6 to 9 ft. water over the coral rock, Pulo Pisang bearing N.N.W., Pulo Senaro S.W. $\frac{1}{2}$ W., distant from the main 3 m. The same vessel saw a sandy patch above water, surrounded by a large coral reef, bearing in one with Pulo Senaro S.E. $\frac{1}{2}$ E., distant from that island 4 or 5 m.; Padang Head bore at the same time N.E. by E.; this is that mentioned at 3 m. E. by N. of Thoren. (See Padang Islands, page 613.) The *Research* found only $2\frac{1}{2}$ fathoms on a shoal, with Pulo Senaro bearing N., and Pulo Bintango E.S.E. This vessel had $3\frac{1}{2}$ fathoms on another shoal, with Pulo Senaro bearing N.W., distant $2\frac{1}{2}$ m., not quite half-way from the latter to Pulo Seronda; and with Pulo Bintango bearing E. 4 or 5 m., she saw breakers on a shoal in one with Padang Head N. by E.

FROM PADANG TO SUNDA STRAIT.

The Coast from Padang, for $9\frac{1}{2}$ leagues to the S., is intersected by numerous bays and inlets, several of which, being protected from the sea by islands, form excellent harbours. The land near the sea is generally of moderate height, and, farther in the country, more elevated.

Boongas Bay, 5 m. to the S.E. of Pulo Pisang, a safe harbour, with 14 or 15 fathoms in the entrance, and from 10 to 6 fathoms inside; but there being a shoal nearly in the middle of the bay, a little more than $\frac{1}{2}$ m. to the E. of Pulo Cassee Islet, it is proper, when going in, to keep near the N. point, and anchor between that side and the island, where there is good shelter. There is also a shoal to the N.N.E. of Pulo Cassee, near the N. side of bay; but by keeping near the island, you pass in safety between it and either of those shoals, and anchor to the E. of it, if you do not intend to go inside. At the S.E. angle of the bay there is a harbour or cove, with 12 to 6 fathoms, water, secured from all winds, having shoal water off the point and island that form the N.E. side of entrance. There are villages all round this bay, and from thence to Padang. About W. by N. $1\frac{1}{2}$ m. from the N. point of bay, lies a dangerous rock, with 15 and 16 fathoms close to it, between which and Pulo Teloor, a small island about a mile to the N.E., there is a safe passage; but it is best to pass outside the rock in 17 or 18 fathoms, and after bringing the entrance of Boongas Bay to bear E., or the middle of a small hill (at the bottom of it) on with a high hill inland, a ship is clear to the S. of the rock, and may steer direct for the bay; when in the entrance she must borrow toward the N. side, to avoid the shoal a little inside, already mentioned. There is a point of land about 2 m. to the E.S.E. of Pulo Pisang, that forms the N. extreme of Brandy-Wine Bay, opposite Pulo Teloor: that point in one with the small hill near it, bears N. by E.; a transit-line drawn from it S. by W., passes over the rock mentioned above, and touches the W. part of Pulo Seronda, or Bobeck.

Pulo Senaro, or Locrone, bears S.S.W. from Pulo Pisang, is covered with cocoa-nut trees; a reef, always visible, bears N.W. by W. about 3 m. from this island, being nearly mid-way between it and the 2-fathoms shoal, already mentioned as 4 m. to the S. by E. of Pulo Sato. The water is deep, from 35 to 40 fathoms around these shoals, and between them and the adjoining islands; if, therefore, the shoals are seen, or their positions known, a ship may pass between them with safety. From Pulo Senaro, $1\frac{1}{2}$ m. to the N.E., there is another shoal having on it 3 fathoms; and about 2 m. S.E. by S. from the same island there is a shoal nearly mid-way betwixt it and Pulo Seronda: another shoal is said to lie about a league nearly S. by W. from Senaro.

Pulo Marra, in lat. $1^{\circ} 18' S.$, and $1\frac{1}{2}$ m. in extent, is inhabited, and affords good water; there is anchorage in a small bay, formed between the N.E. point and a reef that projects from an islet to the S. There is also anchorage under Pulo Bitango, or Pergany, the island nearly mid-way from Marra to Senaro; and under all those near the main that form the E. side of the channel, there is anchorage from 10 to 20 fathoms, and shelter from N.W. or Westerly winds.

PULO MUSKITO, or Niamo, in lat. $1^{\circ} 17' S.$, lon. $100^{\circ} 19' E.$, is a low island, planted with klapper trees, lying off Soengi Pinang and Troessau Bays, and 17 m. S. by W. from Padang Head. It lies 4 m. to the S.W. by S. of Pulo Marra, and has no dangers near it, so that a vessel may pass on any side about 1 m. off. The **Karang Laoet** shoal lies 9 m. to the N.W.

Soengi Pinang Bay. Opposite these islands there are three bays or harbours on the main of Sumatra; the N.-most, Soengey Peesang Bay, bearing about E. by N. from Pulo Seronda, has two rocks in the entrance, with $1\frac{1}{2}$ and 2 fathoms, water, on them; between them and the N. shore,

close to the latter, there is a narrow passage with 15 and 17 fathoms, decreasing inside to 8 and 9 fathoms; there is also a narrow passage between the entrance islets and the S. point of Bay; but this place is not very safe for large ships. Soengi Pinang Bay, bearing about N.E. from Pulo Marra, is safe to enter, by steering in about mid-channel, or borrowing towards the N. side at discretion; this Bay is only a little open to S.S.W., and the depths are from 16 fathoms in the middle, to 7 or 8 near shore, decreasing to 4 and 3 fathoms in the N. part.

TROESSAN, or SAYTAN HARBOUR, formed inside the two large islands, Pulo Sabadda (Tyabeda), and Pulo Troosan (Troessan), is about 5 m. in extent, N.W. and S.E., and very safe, the depths in it generally from 16 to 8 or 9 fathoms, soft bottom. There are two passages into it; the N. one, about 3 cables wide, bearing E. from the N. end of Pulo Marra, and close to the mouth of Soengi Pinang Bay; to enter the harbour by this passage, a ship must keep to the N. into the mouth of that bay, to avoid a 2-fathoms rocky shoal a little more than $\frac{1}{4}$ m. W. from the N. bluff point of Pulo Sabadda, which forms the S. side of entrance. This bluff point, the rocky shoal, and N. point of Pulo Marra, are on the same transit-line, bearing nearly E. and W. of each other; a ship must, therefore, keep to the N. of that line in approaching the entrance of the harbour, which is safe after having passed the shoal. The S. entrance, about E.S.E. from the S. end of Pulo Marra, has in it two islands, and an islet farther out close to Pulo Sabadda, which forms the N. side, as Pulo Troosan does the opposite: the best passage is betwixt the two islands in the entrance, that between the S.-most and Pulo Troosan is also safe, with soundings from 10 to 20 fathoms, and they are about $1\frac{1}{4}$ cables wide; between the N.-most island and Pulo Sabadda there is no passage. Pulo Troosan appears as a projecting part of the main, and is separated from it by a very narrow passage, with 3 ft. water in it. Pulo Saytan, in the middle of the Harbour, is nearly surrounded by shoal water and islets; the N.E. arm of the Harbour, to the N. of that island, is full of shoals, and should be avoided. E. by N. from it, upon the main, and close to the shore, there is a watering-place. Variation, $1^{\circ} 0' E.$

From **Pulo Marra** it is proper to steer to the S.E., passing near the W. point of Pulo Troosan, and from thence on either side of Pulo Kombang, or Babee-kecheel, a small island about $2\frac{1}{4}$ m. to the S. of Troosan. Having passed near this island, to avoid the shoal in the offing, a S.E. course may be continued between Pulo Babee-besar and Pulo Aur, in moderate depths, from 25 to 16 fathoms: from these islands the flag-staff of **Pulo Chenco (Tyingkoh)** may be seen upon a round hill to the E.N.E., towards which a ship (intending to touch there) ought to steer, leaving the small Islands Samanky and Cassee to the N., and she may anchor off Pulo Chenco in 12 fathoms. There is a harbour or cove inside the island, with two passages leading to it; the proper one, on the S. side of the island, has 9 and 10 fathoms, water, and there are from 7 to 4 or 5 fathoms inside, in the harbour. This is a place of considerable trade, and has a wharf for the convenience of lading and unlading goods. To the N. lies Chenco Bay, containing regular soundings and good anchorage at the N.W. part, close to Loompoor Village.

Pulo Aur-besar, in lat. $1^{\circ} 25' S.$, is the residence of a Malay chief, and has on it a conspicuous round hill: on the S. side of it is Pulo Aur-kecheel, also inhabited, and a rocky shoal connects it nearly to the former, and they are called the Aur Islands. The channel into Chenco Harbour, inside these islands, and to the S. of Pulo Babee-besar, and the two small islands to the E., is 3 m. wide, and very safe. There is also a safe passage contiguous to the main, inside of Pulo Babee-besar, Samanky, and Cassee, by keeping nearest to the island, in from 7 to 10, or 12 fathoms. Pulo Babee, or Bayang Bay, to the N. of the islands of that name, and on the E. side of Pulo Troosan, has regular soundings, and is sheltered from N.W. and W. winds. At Pulo Babee-besar wood and water, poultry and sheep may be procured.

Shoals. About a league S. from Pulo Marra, and about the same distance E.N.E. from Pulo Niamo, or Muskito, a small isle in the offing, there is a rocky bank, with 17 and 20 fathoms on it, and 40 fathoms a little way outside. But the only known danger near the passage between Pulo Marra and Pulo Aur-besar is a coral shoal, with 2 fathoms on it, and from 27 to 33 fathoms around: from this shoal the W. point of Pulo Troosan bears N., Pulo Kombang, N.E. by N. about 4 m., which is the nearest island to it; Pulo Babee-besar N.E. by E., and the top of the hill on Pulo Aur-besar E. by S. Bearing about S. from this island, distant $4\frac{1}{4}$ m., lies a small dangerous shoal, over which the sea is seen to roll when there is much swell.

Battuwang and Teloo Cassee, on the main, both containing good anchorage in moderate depths, but open to W. winds are two bays, to the E. of the Aur Islands. About 2 leagues farther to S.E. is situated Batang Kapas Bay, having also good ground for anchoring, but open to S.W. winds.

PULO PANYOE, or Pannau, or Orange Island, in lat. $1^{\circ} 32\frac{1}{4}' S.$, lon. $100^{\circ} 28' E.$, is small, with 40 and 43 fathoms close to it on the outside; it lies nearly W., and 11 m. from Batang Kapas

Bay, and 7 m. to S.S.W. of the Aur Islands. **Erasmus Reef** lies 2 m. to N.N.W. of Panyoe. A shoal is said to lie 2 m. E. by N. from it, the existence of which seems *doubtful*. The other islands from thence to Ayer Adye River, that front the coast at 2 or 5 leagues' distance, are **Pulo Tello**, in lat. $1^{\circ} 38' S.$, distant 8 m. to the S.E. of Orange Island, and 5 m. from Tello Bluff Point, on the opposite shore; to the N. of which lie some rocks near the main, dry at L. W.; and about a league N. by W. from Pulo Tello there is said to be a shoal; from that island breakers also project $\frac{1}{2}$ m. off. **Pulo Ayer** is 4 m. to the S.W. of Pulo Tello; to the N.W. or W.N.W. of it about a league, there is said to be a shoal; and another about $3\frac{1}{2}$ m. to the S. **Pulo Kersik**, or Sandy Island, bears S.E. by E. about $5\frac{1}{2}$ m. from Pulo Ayer, and **Katang-Katang**, or Tree Island, bears about S.S.W. 3 leagues from Sandy Island, or $11\frac{1}{2}$ m. about S. by E. from Ayer, having a cluster of breakers to the N. about a league, and choking the space towards the other islands.

Pulo Bringen, the S.-most of this chain of islands, in lat. $1^{\circ} 54' S.$, lon. $100^{\circ} 36' E.$, is 4 leagues from the main, and 4 m. E. by S. $\frac{1}{2}$ S. from Tree Island; there is a $2\frac{1}{2}$ -fathoms shoal about $1\frac{1}{2}$ m. to the N.N.W. of it; and S. from it about 5 m., there are 3 fathoms on another rocky shoal. From one of the reefs of breakers, Pulo Bringen is said to bear S.S.E. $\frac{1}{2}$ E., and Tree Island S. $\frac{1}{2}$ E. When in 24 fathoms about 2 leagues off shore, with the Volcano Mount E. $\frac{1}{2}$ N., and Pulo Bringen bearing S., a sand in one with breakers bore N.W. $\frac{1}{2}$ W., other breakers S.W. $\frac{1}{2}$ W., and a reef on which breakers were visible at times W. $\frac{1}{2}$ N. There is also a reef under water to the E.N.E. of Tree Island, rendering the passage between it and Pulo Bringen unsafe. Opposite to those dangers there is a reef called **Karang Semedang**, within 2 or 3 m. of the coast, on which the sea breaks in bad weather; it bears from Pulo Bringen about N.E. by E., distant 8 m., and from it the two islets Kersik and Ayer are about in line. About 4 m. to the W. of it there are 15 or 16 fathoms, water, and 24 fathoms near the dangers in the offing.

Departing from Pulo Chenco, or having passed through between it and Pulo Aur-besar, if a ship is bound to Ayer Adye River, it will be prudent, in coasting along, to keep 4 or 5 m. off shore, in soundings from 20 to 25 fathoms, to avoid the dangers near it; care will also be requisite to give a proper berth, in passing, to the shoals and islands in the offing; more particularly in the night, for in the day, with a good look-out, most of the dangers will be visible, and a ship may then borrow occasionally to 15 or 16 fathoms. When Pulo Bringen bears about W.S.W., she may haul to the E. for the anchorage off Ayer Adye River, which is not much frequented, being considered unsafe with N.W. and Westerly winds.

Ayer Adye, formerly called **Ayer Raja**, is not easily known, the village being about 2 m. up the river; but a flag is sometimes hoisted near the entrance. It may be known by a remarkable round hill, covered with trees near the sea, about 4 m. to the N. of the river's mouth, called Linga Hill, or by some Volcano Mount. When at anchor in $5\frac{1}{2}$ fathoms, soft clay, with the flag-staff at the river-mouth, bearing E. by N. nearly 2 m. off, this mount bears E.N.E., and Pulo Bringen W. $\frac{1}{2}$ N. It is prudent not to anchor under 8 fathoms, with the flag-staff E., Pulo Bringen W. $\frac{1}{2}$ N., and Indrapour Point S. $\frac{1}{2}$ W., off shore about $2\frac{1}{2}$ m. If N.W. winds are apprehended, a ship may anchor out in 12 or 13 fathoms, in order to clear Indrapour Point, should she be unable to ride. It is dangerous to enter the river with a boat at L. W., particularly when there is much swell, for the surf is then high on the bar.

INDRAPOUR POINT, in lat. $2^{\circ} 10' S.$, lon. $100^{\circ} 46' E.$, and 5 leagues to the S. of Ayer Adye, is low, and its extremity covered with trees: as foul ground projects out a little way, it should not be approached too close. From this Point the coast stretches to the N.E., and forms an extensive, open bay, between it and Ayer Adye, with Indrapour River at the bottom of it, a little to S. of the latter place; and Passier Ganting is a village to S. of the river. From hence to Fort Marlborough there are no islands near the coast, Pulo Bringen being the S.-most of the chain or long range, which may be said to commence at Passage Island, near Sinkel. Leaving Ayer Adye, or the channel betwixt it and Pulo Bringen, a ship should haul out of the bay, and pass Indrapour Point at 3 or 4 m. distance; if the wind be steady, and bound to Bencoolen, a direct course may be steered along the coast, keeping from 2 to 5 leagues off; but with light winds it will be proper to preserve moderate depths, from 15 to 25 fathoms for anchoring, if requisite; never exceeding 30 fathoms, nor borrowing under 10 fathoms towards shore, in case of getting into rocky ground.

Moco Moco, in lat. $2^{\circ} 35' S.$, lon. $101^{\circ} 4' E.$, distant $10\frac{1}{2}$ leagues to the S.E. of Indrapour Point, situated at the bottom of a small bay, is a place of some trade; the two points that form the bay are covered with tall trees; and about 4 or 5 leagues to the N.W., a remarkable gap in the trees may be discerned in coming from that direction. Having passed Indrapour Point, about 4 m. off, a ship bound to Moco Moco should coast along about the same distance, until near it; the houses and flag-staff will then be discerned, and she may anchor in 10 fathoms, soft ground, with the latter bearing E. by N., and Moco Moco remarkable peak inland N.E. $\frac{1}{2}$ N., off shore $2\frac{1}{2}$ or 3 m. Small

vessels may, if requisite, anchor in 6, 7, or 8 fathoms. Country boats must be employed in landing, for a ship's boat cannot, without great danger, on account of surf. Near to Moco Moco River is situated that of Mandoota, the mouth of which may be seen in coming from the S. About 3 or 4 leagues W.N.W. from Moco Moco there is said to be a bank of rocks and sand, having on it from 18 to 11 fathoms in most parts: by some navigators it is thought to be dangerous, the sea breaking on it in blowing weather, and said to have only $2\frac{1}{2}$ or 3 fathoms, water, on the shoalest part; consequently, it should be approached with caution; it is now omitted from the Admiralty charts. A shoal extends from Moco Moco 7 m., about $1\frac{1}{2}$ m. off shore.

Ayer Dicket, $3\frac{1}{2}$ leagues to the S. of Moco Moco, a little S. from a bluff point clothed with trees, may be known by a clump of tall trees, growing thicker on each side of the river mouth than anywhere else. There being a dangerous bar, the river is unnavigable, even for boats. A ship may anchor off it, in 8 or 10 fathoms. A ship bound from the S. to Moco Moco may round the bluff point to the N. of Ayer Dicket in 8 or 9 fathoms, when the Southerly monsoon prevails, and haul gradually into the bay, to prevent being driven to leeward. Between that point and Moco Moco a shoal bank projects several miles from shore, said to have only 4 and 5 fathoms rocky bottom on it in some places; and the coast is lined with a sandy beach, towards which a great swell generally rolls, and this is the case on most parts of it, particularly to the S. of the equator.

Bantall River, situated in a bay about $2\frac{1}{2}$ leagues to the S.E. of Ayer Dicket, may be known by two white cliffs a little to the N. of it, appearing from the offing like boats' sails: in coming from the N. towards it, a ship may coast along in 10 to 15 fathoms, taking care not to borrow towards shore where rocky bottom is found. The best anchorage in the road is in 8 or 9 fathoms, ooze and sandy bottom, with the white cliffs N.N.E., and the river's mouth N.E. Between Bantall and Ipoe are three rivers, Triamang, Ayer Etam, and Ayer Ruttah; Triamang, the N.-most, may be known by a small, red cliff, forming the low point on the N. side of entrance: the coast, embracing those rivers, may be approached to 12 or 14 fathoms, regular soundings in most places.

Ipoe, or Aypour, in lat. $2^{\circ} 58' S.$, about $6\frac{1}{2}$ leagues to the S.E. of Bantall, where there is another river in the bottom of a bay, may be known by three red cliffs to the S., and three green hills near the sea. With the central hill bearing N.E. by E., large ships should not anchor under 9 or 10 fathoms, where the road is tolerably clear; farther in, the bottom is foul and the water shoal. From the shore to the S. of Ipoe, a bank of foul ground projects nearly $1\frac{1}{2}$ leagues to seaward, and about 11 leagues to the S.E., having on it from 6 to 10 fathoms, coral and coarse sand; and on its outer edge there is a coral rock, on which the *Swallowfield* struck, bearing S.W. by S., 2 leagues from Ipoe, with only 14 ft. water, and having from 8 to 16 fathoms all round. It should not be approached under 10 or 12 fathoms, as it is very steep, there being, a little way outside of it, 30 fathoms, then no ground. When Ipoe bears N.E. by E., a ship is clear to the N. of the bank and rock, and may then haul nearer to the land if coming from the S.; but when abreast of this danger, she ought to keep about 3 leagues off shore.

Ketaan, or Caytone, in lat. $3^{\circ} 25' S.$, distant about 11 leagues to the S.E. of Ipoe, has a white cliff to the S. like a castle, and breakers to the N., nearly a mile from shore. Rocky ground with irregular soundings projects about 2 leagues out from this place, and from hence to the N. towards Ipoe: a ship ought, therefore, to keep well out in sailing between them; for about 4 leagues off this part of the coast, where no soundings are got, the water will shoal suddenly if she stand towards shore. Nearly mid-way between Ipoe and Caytone there is a small place called Sablat, appearing like an opening betwixt reddish cliffs: and Caytone has a similar appearance. From Caytone the distance is 11 leagues S.E. to Fort Marlborough, and the coast in this space is safe to approach occasionally to 11 or 12 fathoms, the soundings being more regular than farther to the N.; from 12 to 20 fathoms are good depths to preserve in sailing along. **Laye**, a small place 5 leagues to S.E. of Caytone, has regular soundings off it; when in 9 fathoms, with the Sugar-loaf bearing E. by N., Laye House, situated in a small bay, bears N.E. $\frac{1}{2}$ N. Polley, or Pali, another small place, lies 2 leagues more to the S., having some red cliffs between it and the former place. Songy Lamo Point, about 2 leagues S. from Polley, and near 7 m. to the N. of Fort Marlborough, ought not to be approached under 10 fathoms, for a rock with only 2 or $2\frac{1}{2}$ fathoms on it, and 7 fathoms close to it, is distant about $1\frac{1}{2}$ m. from the point, with the Sugar-loaf, when on with the point, bearing N.E. by E., and Fort Marlborough Flag-staff about S.E. by E.

BENCOOLEN RIVER, which falls into the bay about $1\frac{1}{2}$ m. to the N.E. of Oojong Carrang, the point on which Fort Marlborough is built, has from 4 to 6 ft. on the bar, and from 8 to 12 ft. inside. The English at first formed their settlement here, but considered it unhealthy, and removed to the S. point of bay, where Fort Marlborough was built on ground a little more elevated than the former, and is now a Dutch possession, according to a treaty with the Netherlands Government.

Fort Marlborough is in lat. $3^{\circ} 48' S.$, lon. $102^{\circ} 14' E.$ Variation $0^{\circ} 50' E.$ **Oojong**

Carrang, or Tapu Padrie, the point on which the fort and town are built, and now having a light-house, has a level appearance, and is moderately elevated; but the land in the country to N.E. is high and hilly: one of the hills, called Sugar Loaf, is a conspicuous mark for avoiding the shoals. The common anchorage in the road is about mid-way betwixt Rat Island (Pulo Tikoes) and the town, in 11 or 12 fathoms; with the flag-staff E.N.E., Poelo Point about S.E. by S., and Rat Island S.W. by S. A ship ought not to go under 11 fathoms, as the bottom is mostly rocky, and if to remain in the road a few days, it may be prudent to examine the bottom by sounding around in a boat within range of the cable, for ships do not moor unless it be with a hawser and small anchor to steady them. Close to the entrance of Rat Island Basin, and fronting it to the distance of a mile to the N.E., the bottom is mostly soft, where ships in the Southerly monsoon may anchor in 13½ or 14 fathoms under the reef that surrounds it. When the N.W. winds prevail strong from Sept. to March, a heavy sea frequently rolls into the road, making ships labour greatly at their anchors. Ships that do not go into Poelo Bay, or Rat Island Basin, in this season, may anchor to the E., within 1 m. of the island bearing W. by N., in about 15 fathoms, where the sea will be partly broken by the reef. The same business may be done from this station in favourable weather as if a ship were in the road, for sailing-boats, passing to and from Fort Marlborough, are confined to one trip in twenty-four hours, by the land and sea-breezes; besides, the N.W. winds only are to be dreaded, and if a ship part her cables, she will run for Poelo Bay with little or no canvas spread.

The Inner Road, with 4 and 4½ fathoms, water, a little to N. of the fort, and inside the N. and S. breakers, is sometimes frequented by small vessels in the fair season, for the convenience of loading and unloading. But it is imprudent for boats or vessels of any kind to venture inside without a guide, for several boats have been lost upon the N. or S. breakers, not always visible when sea is smooth: for then a high surge is only at times seen to roll over the rocks, which would prove fatal to any boat that unfortunately got into it. To pass from the Road in a boat through the channel between the N. and S. breakers, steer from Rat Island towards the Sugar Loaf, keeping this rather on the starboard bow until the steeple appear on the W., or *sea-face*, of the nearest bastion; the boat will then in either case be inside, or past the breakers, and may haul in close to the shore-reef, keeping along its edge until within the fort, and opposite to the landing-wharf. With a Northerly wind, it is best to pass to the N. and E. of the N. breaker, by keeping 2 m. to the N.W. of the fort until the conspicuous tree is brought behind the N.E. end of the N.W., or *sea-curtain*. With a Southerly wind, when coming from the road, it is best to steer for the town, and pass to the S. of the S. breaker, and close along the edge of the shore-reef, from its outer extremity to the landing-place. Close to the N. and S. breakers there are 7 and 8 fathoms outside, and 6 fathoms inside of them. Nearly abreast the fort, a little outside the landing-place, there is a shoal patch in 3½ fathoms, at a small distance from the edge of the shore-reef. The landing-place is protected from the sea by a rocky ledge fronting it at 150 yards off; boats pass round the E. point of this ledge, and then haul in to the S. for the wharf. Bullocks, poultry, fruits and vegetables of various kinds, may be got here, and the country around has a pleasant appearance.

Light. Bencoolen has now a *fixed, Red* light, on Tapu Padrie Point, or the S.W. part of Ojong Carrang, and nearly ¼ m. to S.W. of the tower of Fort Marlborough. This *Red* light is 59 ft. above sea, and only visible 3 m. off, when bearing between E. by N. and about S.; it is for the guidance of boats and small vessels.

Pulo Tikoes, or Rat Island, in lat. 3° 51' S., bearing S.W. by W. from Fort Marlborough, distant about 5½ m., is surrounded by an extensive coral reef, partly dry at L. W., which projects 1½ m. to the N.W., and to the S., about ¾ m. The island is low and small, having on it a few Palmyra trees, and some godowns, or houses for receiving pepper, with a small battery of guns for its protection, and now it has a light-house. To the N. of the island there is an excellent gut or basin in the N.E. side of the reef, with depths of 5, 6, and 7 fathoms in it, and 3 or 2½ fathoms at its upper end. Ships requiring repair, or having a cargo to receive or deliver at Fort Marlborough, generally go into this basin, where they moor head and stern to anchors laid upon the bank on each side, or nearly in a N.W. and S.E. line, directly across the basin. The passage into the basin is close to edge of the reef on the W. side of entrance, for several detached rocky patches bound the E. side, with 7 and 8 fathoms, water, close to them. The bottom in the basin is soft mud and sand, and the coral bank on each side being a soft perpendicular wall, no injury is sustained if, during the strong N.W. gales, a ship part her mooring-junk or cable and is driven against the S.E. side. Ships proceeding to the basin generally anchor at the entrance, and warp into it; from this place, goods may be conveyed to or from Fort Marlborough, with the same facility as from the road, the boats being able to make one trip daily with the land and sea-breezes.

Here a ship is completely sheltered from sea by the reef; whereas it often runs so high in the road, that goods are unsafe in boats alongside, and they are frequently forced to run for shelter into Poelo Bay, the N.W. winds sometimes giving very short warning of their approach.

POELO BAY, 8 m. to the S. of Fort Marlborough, is an excellent harbour, secured from the sea by a neck of land on the N. and W. sides, which is usually called Poelo Point; that part fronting the sea is called **Oojong Siaboeng**, or **Buffel Point**, or the W. point, and the E. extremity the E. point; the latter is low and sandy, and forms the N. side of bay. When ships at anchor in the road are unable to ride during strong N.-Westers, they slip their cables if it is daylight, and run for Poelo Bay. In doing so, they should steer S. and S. by E., taking care not to come under 12 fathoms until past the **Black Rocks** or **Goesong Lampoeyang**, lying 3 and 4 m. to the E. and E. by S. of Pulo Tikoes Light; these rocks may not be always discernible in blowing weather, when the sea breaks much in the channel. They lie about half-way between the road and Poelo Point, or 4 m. from the latter; and if the low sandy point of the bay is not brought to the S. of S.E. by E., they will be avoided. When clear of the Black Rocks, a ship should haul to the E. for **Sillebar**, on the E. side of the bay, and the depth will decrease gradually to 8 fathoms as the low sandy point that forms the opposite side is approached: this at L. W. may be rounded very close, and when it is H. W., at the distance of a cable's length; she must then haul up under the S. side of it, and anchor in 5 or 6 fathoms, with the extremity bearing about N.N.E., distant from the Crown pepper godown nearly $\frac{1}{4}$ m. Near shore, the S. side of the bay is shoal and rocky, and it would be imprudent to run too far into the W. angle of it, where there is a 4-ft. rocky shoal, the only one in the bay. If a ship happen to lose all her anchors, she ought to haul close round the point; and when well inside of it, she may run on shore in the mud without fear, opposite the nearest tree, having previously prepared the boat with a hawser to make fast to it.

Sillebar River Entrance, to the N.E. of the bay, has 4 ft. water on the bar; inside it stretches both N. and S., near and parallel to the coast-line, the S. branch leading to a great lake by the sea, to the S.E. of Poelo Bay. The tide rises from $3\frac{1}{4}$ to 5 ft. in the springs; H. W. about 6 h. on F. and C. of moon. The bay, being surrounded with low swampy ground, is considered to be very unhealthy, and the drinking-water of a pernicious quality; therefore Poelo Bay is little frequented by ships. Ships driven from their anchorage in the night cannot run for Poelo Bay without the risk of getting on the outer low sandy point, for it will not be visible, nor do the soundings answer as a proper guide, there being 8 and $8\frac{1}{4}$ fathoms very close to it, and nearly the same depths in a direct line from it to the N.N.W.; it therefore seems advisable, if a ship cannot ride during the night, to run out to sea, betwixt Rat Island and the Asia Shoal.

Light. **Puloe Tikoes**, or Rat Island, in lat. $3^{\circ} 51' S.$, lon. $102^{\circ} 10' E.$, has now a fixed light, elevated 89 ft., visible 8 m. off.

The Dangers off Benecoolen and Poelo Bay, are *firstly*, the rock off Songy Lamo Point, rather over 4 m. to N.W. by N. of Fort Marlborough; *then* the N. and S. breakers off Fort Point, already mentioned, *then* at $1\frac{1}{4}$ or 2 m. to S. by W. of the point, lies the **Middle Shoal**, with 4 fathoms rock on it, situated nearly mid-way between the S. breaker and Black Rock, with the Sugar Loaf bearing about N.E. $\frac{1}{4}$ N.: close to it on the outside there are 9 and 10 fathoms, and $8\frac{1}{4}$ fathoms inside. **Goesong Lampoeyang**, or **Black Rock**, about $1\frac{1}{4}$ m. to S.E. of the former, and nearly S. from Marlborough $3\frac{1}{4}$ or 4 m., is generally discernible by the sea breaking on it; inside of it the depths are 8 and 9 fathoms, and the same outside in a small channel betwixt it and the False Black Rock, which lies about $\frac{1}{4}$ m. W. from the other, with $3\frac{1}{4}$ fathoms water on it. This danger is with the Sugar Loaf bearing N.E. by N., and with the steeple flag-staff bearing from N. to N. $\frac{1}{4}$ E. These shoals are avoided on the outside by keeping in above 11 fathoms; and by keeping in about 8 fathoms, or rather less, a small vessel may occasionally pass inside of them.

Carrang Byang, and Carrang Ikan Tandoo are two rocky shoals together, with 5 and 6 fathoms water on them, bearing from Rat Island between W. and W.N.W., distant 2 or $2\frac{1}{4}$ m.; betwixt them and the reef surrounding the island there is a passage nearly a mile wide, with 16 and 17 fathoms water. To avoid these shoals, Rat Island light, when it bears from E. to E.S.E., should not be approached nearer than 3 m.; and as the Sugar Loaf bears from them N.E. $\frac{1}{4}$ E., it should be kept to the E. of that bearing, in coming from seaward, until Rat Island bears S.E. In working to or from the road by the N. channel, which is spacious and safe, a ship may stand near the edge of Rat Island Reef on the S. tack, and to 10 fathoms towards Songy Lamo Rock and the main. There are two or three small rocky shoals, called Carrang Ikan Chaby, with 4 and 5 fathoms water on them, distant about a mile E.N.E. from Rat Island, having a narrow channel with 10 and 12 fathoms betwixt them and Rat Island Reef; a vessel without a pilot should not pass through it, but keep a full mile off Rat Island Reef, to pass outside of these shoals, then haul up to S. and S.W., to anchor under Rat Island.

Carrang Lebar, or Asia Shoal, extends E. and W. $1\frac{1}{2}$ m., and is about a mile in breadth; although 4 fathoms is the least water that has been found, the bottom being coral and sand, there is a heavy ground-swell on it, which sometimes breaks in bad weather; it ought therefore to be carefully avoided, more particularly as it lies much in the way of ships approaching the road from the S., and there may probably be less water on some spots than 4 fathoms. From Rat Island, the shoal bears between S.S.E., and S. by E., distant 5 m.; and from the W. point of Poelo Bay, the nearest part of shoal bears about W. by S., distant 3 m. The Sugar Loaf bears from the E. end of it N.N.E., and when a ship is outside the shoal, that hill is to the E. of N.E. by N.

To approach the Road or Rat Island by the outside channel, between the island and shoal, a ship ought not to bring the island to the W. of N. $\frac{1}{2}$ W. until within 3 m.; then she may haul in for it and the road, or directly to the E., for Poelo Bay, if bound there. The depths between the shoal and Rat Island are from 22 to 17 fathoms, and in the other channel, betwixt it and the main, generally 17 and 18 fathoms. Coming from the S. through this channel, a ship must keep within 2 m. of the W. point of Poelo Bay (Buffel Point) until it bears E., and may then steer for the island: Buffel Point may be approached within $\frac{1}{2}$ m. or $\frac{3}{4}$ m. occasionally in working; but a reef projects from it about $\frac{1}{2}$ m. off, with 3 fathoms on its outer edge, and 13 or 14 fathoms close-to. To avoid the Asia Shoal fully on the W. side, when going in or out by that channel, the island may, in passing the shoal, be kept bearing N. The approach to this shoal may be known by the overfalls towards the outer edges of it, if the lead is kept going.

OOJONG SIABOENG, or BUFFEL POINT, in lat. $3^{\circ} 57' S.$, lon. $102^{\circ} 15' E.$, a round bluff headland covered with trees, discernible from the road of Fort Marlborough, is about 2 m. to the S. of the W. point of Poelo Bay, and they are frequently considered as one and the same. From Buffel Point the coast of Sumatra extends S.E. about 60 leagues to the W. part of Flat Point, which is the S. point of Sumatra Island, and forms the N. side of the entrance of Sunda Strait. The whole of this extent of coast is generally bold and safe to approach, and the land mountainous a little in the country; soundings extend from the shore about Fort Marlborough and Poelo Bay, to the distance of 4 or 5 leagues; and from thence to Manna regular soundings over a sandy bottom are found, where a ship may occasionally anchor in moderate depths, if it fall calm and the current be unfavourable; but farther to the S. the coast becomes more steep, soundings extending out only a short distance, until Little Fortune Island, near Flat Point, is approached, where they are got 2 leagues from the main.

Manna Point, in lat. $4^{\circ} 31' S.$, lon. $102^{\circ} 42' E.$, bearing nearly S.E. from Buffel Point, distant $14\frac{1}{2}$ leagues, may be known by a small hill with Palmyra-trees on it, and by its being the next headland to Buffel Point that projects considerably into the sea. Betwixt them there are several small places: Moreallam, 14 m. from Buffel Point; Saloomale, 5 m. farther; Pring, in lat. $4^{\circ} 21\frac{1}{2}' S.$, distant 10 leagues from Buffel Point; Alassa, 5 m. more to the S.E.; and Penoo, the same distance from Manna. The coast in this space may be approached to 15 or 20 fathoms, and in some parts to 11 or 12 fathoms; but from 18 to 35 fathoms are good depths to preserve in sailing along. About 4 m. to the S.E. of Buffel Point, there is a narrow spit, with 7 fathoms rocks on it, 15 fathoms close outside, and 12 fathoms soft ground between it and the shore, from which it is distant about 2 m. The spit extends parallel to the shore about $\frac{1}{2}$ m., opposite a low point of land, and least water found on it has been 7 fathoms. At Pring, the India ships used sometimes to anchor to receive pepper; the best anchorage is in 12 fathoms, muddy bottom; for farther in, the ground is foul and rocky on the edge of a shoal, projecting about 2 m. off shore. With the Resident's house bearing N.E. by E., distant about 3 m., the *Kent* shoaled at once from 9 to 7 fathoms, and anchored during a strong gale, with rocky bottom; about $\frac{3}{4}$ m. from the ship, the boat had 7 fathoms, very rocky, and farther in found the water shoal suddenly, the sea breaking there when blowing fresh.

Manna Town is near the point of that name; the India ships used to touch, to take in pepper from thence and Penoo, and usually anchored in 10 or 12 fathoms. A small cascade falls perpendicularly from the steep cliffs which line the shore near Manna, but landing should be avoided, as a tremendous surf generally prevails along this coast. Manna Point may be rounded in 14 fathoms, but not nearer, as a reef is said to project from it about a mile; to the S. of the point there are 12 and 14 fathoms about $1\frac{1}{2}$ m. from it; but no ground 50 fathoms at the distance of $2\frac{1}{2}$ or 3 m.; for the coast to the S.E. becomes more steep. About 6 leagues S.E. from Manna there is a place called Pethang or Padang.

Kouwer or Cawoor, in lat. $4^{\circ} 51' S.$, distant $15\frac{1}{2}$ leagues to the S.E. of Manna, is situated near the S. part of a concavity in the land about 5 m. in length, where, in the small bay of Cawoor, ships are sheltered from Southerly winds; and in Sambat Bay, which forms the N. part of the concavity, there is good shelter from N.W. and Westerly winds, in 9 or 10 fathoms, sand and muddy bottom. From Sambat River on the E. side, to Boendar Point, that forms the W. extremity,

this bay is about $2\frac{1}{2}$ m. wide, having the village Boendar at the N.W. side, where is a small river and level country. From the anchorage in the bay, Mount Ponyong may be seen over the other land, bearing S.E. by E. The anchorage at Cawoor is in 11 or 12 fathoms, with the Resident's house bearing about E.N.E., distant 1 m., the S. point of bay S. by E., $1\frac{1}{2}$ m., and the W. extreme of the land W.N.W., about $3\frac{1}{2}$ m. The passage for boats going to the factory is betwixt two coral banks, and very narrow, with breakers on each side: about 100 yards to the W. of the factory there is a small black rock on the W. bank, which must be kept very near on the *port* hand. Steering out from the anchorage to the W., the depth increases regularly, but rather suddenly, from 14 fathoms in the road to 42 fathoms, sand and shells, a little way outside the bay. About $\frac{1}{2}$ m. from the shore, outside the S. point, there are 40 fathoms water, and 20 fathoms close to the breakers.

PULO PISANG ISLAND, in lat. $5^{\circ} 9' S.$, lon. $103^{\circ} 55' E.$, bears from the S. point of Cawoor Bay about S.E. by E., distant $11\frac{1}{2}$ leagues; the coast between them is steep, there being no soundings except very close in. Point Ponyong, 8 m. from Pulo Pisang, projects a little into the sea; and Mount Ponyong, in lat. $5^{\circ} 24' S.$, is a high, remarkable mountain near the sea, which bears nearly N. from the island, and may be discerned a great way from the offing. Pulo Pisang is of round form, about a mile in diameter, consisting chiefly of a bed of rock crystal, and on the E. side, between it and the main, there is good anchorage and shelter from N.W. and Westerly winds, in 12 or 15 fathoms. The *Revenge* moored in 16 fathoms with the island bearing from S.W. $\frac{1}{2}$ S. to W.N.W., Sillaloo Rock at Crooe S.E. $\frac{1}{2}$ E., extremes of Sumatra from S.S.E. to W.N.W. $\frac{1}{2}$ N., and the rocks about 50 yards off the S.E. part of the island S.W. by S. southerly, distant from the island three cables' lengths, and from the main $\frac{1}{2}$ m. To the N. of the island, about half-way between it and the main, there is a reef of rocks, on which the sea generally breaks, having 12 and 16 fathoms on the S. side, 20 fathoms on the W. side, 12 fathoms foul ground to the N.; and about N. or N. by W. from the reef there is a patch of coral rock, with 2 fathoms on it, seeming to preclude any safe passage for large ships betwixt the reef and Sumatra shore; but a small ship, by keeping about 2 cables' lengths from the island, may come in from the N., or pass out that way. Wood and water may be got on the main to N.E. of the island, and soundings are regular in the Road, which extends from the E. side of island close to Sumatra shore. A reef lines the outside of the island, stretching to a small distance, from which the depth increases quickly in standing to the S., there being 36 and 40 fathoms about $\frac{1}{2}$ m. off.

Crooe, in lat. $5^{\circ} 19' S.$, lon. $104^{\circ} 2' E.$, 6 m. S.E. by E. from Pulo Pisang, is situated at the bottom of the bay, on the bank of a small river, navigable by small boats at H. W., close to the N. of Sillaloo Rock. All round the bay, from abreast of Pulo Pisang to Crooe, soundings of 35 fathoms are got about $\frac{1}{2}$ m. from shore, and they extend farther out from the latter place, but care is required, if working into Crooe Road, to avoid a dangerous rocky shoal, discovered by H. M. S. *Belliqueux*, which ship touched here, and procured good water, bullocks, buffaloes, and refreshments. This shoal bears about N. $\frac{1}{2}$ W. from Sillaloo Rock $1\frac{1}{2}$ m.; from a remarkable tree near the shore at the bottom of the bay it bears S.W., and is from $\frac{1}{2}$ m. to $\frac{3}{4}$ m. off the nearest shore, and from the anchorage of Crooe about N. by W. $\frac{1}{2}$ m. off. There are $1\frac{1}{2}$ fathoms, water, upon this rocky shoal, 14 and 15 fathoms inside of it, and 18 or 20 fathoms to the S., between it and the anchorage of Crooe. Sillaloo Rock appears like an island when seen at a distance; foul ground projects from it about 2 cables into 10 fathoms, from thence sandy bottom to 54 fathoms about $\frac{1}{2}$ m. off shore. The anchorage is safe in the S.E. monsoon, being well sheltered from these winds by Carrang Pingan, the point that forms the S. side of the bay, off which there are no soundings about 2 cables from the breakers, and 40 fathoms close-to. **Tinnambang**, in a bay to S. of Pingan, is very open, but during S.E. winds affords a landing-place, with the S. point of bay bearing about S.W. by S.; ships can anchor in 10 or 11 fathoms, with that point about S. by W., and a reef off Carrang Pingan about W. by N.

Benkoenat, or Bencoonat, in lat. $5^{\circ} 35' S.$, lon. $104^{\circ} 15' E.$, bearing about S.E. from Pulo Pisang 32 m., is a small town or village, subject to Crooe, on the N. side of a low point, having on it Palmyra trees: the bay here is interspersed with rocks, which stretch out nearly a league from the point, but there is a passage for boats or very small vessels close along the shore. Siggen Point, 8 m. to the N.W., forming the W. extremity of the bay, has a reef projecting from it about 2 m., with 20 fathoms close-to; and between Crooe Bay and that of Bencoonat, soundings extend a little way from the land. The coast hereabout, and farther to the S., is generally low fronting the sea, but inland the country is mountainous. A ship intending to touch at Bencoonat should anchor well out, to avoid the rocky ground.

Little Fortune Island, called by natives **Pulo Batoa Ketyl**, in lat. $5^{\circ} 55' S.$, lon. $104^{\circ} 26' E.$, distant about 5 m. from the main, bears nearly S.E. by S. from Bencoonat $7\frac{1}{2}$ leagues; it is low and woody, and about a mile in diameter, and is surrounded by a reef of a mile in extent.

Along the coast between them, soundings are found 3 or 4 m. from shore; and near the Island the bank becomes more regular, and extends farther out, having soundings on it from 2 to 3 leagues off the main. About 4 leagues to the N. of Little Fortune Island, a low point of land forms the N. extreme of a bay, where there is a village. This Island is surrounded by a reef, but there is good anchorage about a mile to the E. of it in 8 or 9 fathoms, and a passage betwixt it and the main, with various depths, from 5 or 6 to 12 and 13 fathoms.

Blimbing Bay, on the opposite side, a little to the N. of Flat Point, also affords good anchorage, where a ship may lie in 7 or 8 fathoms at the entrance of the Bay, and small vessels may lie in 3 fathoms inside, sheltered from all winds. The small River Blimbing is on the E. side of the Bay, but it is brackish, and there is fresh water at the S.W. side, inside the point that forms it, from which a reef projects to the N. about $\frac{1}{2}$ m. or $\frac{1}{4}$ m. off. The soundings are a guide in passing outside Little Fortune Island in the night, and from thence round Flat Point, for they extend more than 2 leagues off shore; and the bank is flat round the island. If coasting with the land-wind and favourable weather, you may borrow into 15 fathoms occasionally, if the lead is kept going; 12 fathoms during the night seems too near, particularly in a large ship. The bank of soundings extends far S. from Flat Point.

Flat Point, in lat. $5^{\circ} 59'$ S., lon. $104^{\circ} 32'$ E., distant 8 m. to the S.E. of Little Fortune Island, is the S.W. extremity of Sumatra, bounding the entrance of Sunda Strait on the N. side; and the narrow neck of land by which it is formed separates the deep inlet called Keyser Bay from Blimbing Bay. The S. part of this neck of land is low and woody, extending $3\frac{1}{2}$ leagues E. and W.; the E. end of it called Rada Point, and sometimes Tanjong Chinna, bounding the entrance of Keyser Bay. The ship *Speke* anchored to the N. of Rada Point, in Tampang Bay, in 17 fathoms, sand, about $\frac{1}{2}$ m. from shore, where she filled up her water, and was sheltered from N.-Westers.

Bank. At 3 m. to S.W. from Flat Point is a narrow bank of reddish sand, with from 8 to 15 fathoms, E.S.E. and W.N.W. about 6 m., by 1 m. in breadth; outside of this bank the soundings increase rapidly to 30 and 50 fathoms; but within is a channel $1\frac{1}{2}$ m. broad, with 14 and 15 fathoms: at night, when approaching Sunda Strait, the soundings will be a good guide in passing Fortune Island and Flat Point: 6 m. off shore are 40 and 30 fathoms.

PASSAGES AND CHANNELS.

The Channels, or Routes, along the W. coast of Sumatra, may be considered as three in number:—That to the W. of all the islands in the open sea, recommended as the best at all times, called the **Outer Passage**; the space between the chain of large islands in the offing and those smaller islands interspersed along the coast, which may be called the **Middle Passage**, and which is generally from 4 to 10 leagues distant from the shore of Sumatra, and is connected with the Inner Passage in some places: and the **Inner Passage**, close along the coast, and betwixt some of the islands near it.

The Outer Passage, to the W. of all the islands, in the open sea, is the best of the three; for there, S.W. and Southerly winds often prevail, when N.W. squalls, and variable, baffling winds, may be experienced close to the land. The middle route should not be followed when bound to the N., nor at any time, if it can be avoided without inconvenience: for, although it is wide, with few dangers, and may be adopted by night or day, when the weather is clear and favourable, ships are liable to be drifted about by currents when the winds are faint and baffling, there being no anchorage; and in some parts towards the main, dangerous coral shoals, from 1 to 2 and 3 fathoms under the surface, shoot up from deep water at the edge of soundings.

The Inner Passage has been generally recommended to navigators; but probably no ship should adopt it, unless when trading to different places on the coast, and it should seldom be chosen by ships bound to the N. in either monsoon; but having in many places moderate depths for anchoring occasionally, it is preferable in that respect to the Middle one. On account, however, of the numerous small islands and many dangerous shoals, the true positions of which are not correctly determined, it is to strangers an intricate and embarrassing passage. Ships proceeding by it are generally obliged to anchor during the night.

It has been said that all the shoals on this coast are *white* coral rocks, discernible from the mast-head a mile off in the daytime, even when they are 3 fathoms under water. On the contrary, many of the shoals consist of *black* rocks, not discernible until close to them, although covered only with 8 or 10 ft. water: and several ships have grounded upon these shoals in the daytime, before they could be perceived. A good look-out from the mast-head is nevertheless useful, particularly when the sun shines; for many of the dangers will then be discernible before they are approached very close. Ships bound to parts of the coast situated betwixt Bencoolen and Tappanooly may, in

coming from sea, pass through some of the channels formed by the principal islands in the offing, adopting a safe and convenient one, according to the season and prevailing winds. An account of these channels will be found in pages 626 to 630, where the islands are described. Ships bound to the N. part of the coast, anywhere betwixt Tappanooly and Acheen Head, should pass to the N. of Hog Island, and make the land near to their port; but when Northerly winds prevail, they ought to keep well to windward, and, after making the land, coast along at a moderate distance to the place to which they are bound.

MONSOONS AND CURRENTS.

The winds on the W. coast of Sumatra are denominated the S.E. and N.W. monsoons, agreeably to the direction in which the periodical winds are found to blow in S. latitude; but they are subject to great irregularities on this coast, on account of numerous islands in its vicinity; and the two extremities of the island being far distant on different sides of the Equator, the same winds cannot be expected at all times to prevail along the whole coast. Whilst the N. part of the coast enjoys fine weather from Oct. to April, N.W. winds with rain and squally weather prevail on the S. part. In the opposite season, when the S.E. monsoon is blowing on the S. coast, the N.W. monsoon prevails, with squalls and rain, close to the coast in N. latitude; but outside the islands, in the open sea, the wind is then generally between the S. and the S.W. points.

The S.E. Monsoon, or dry season, generally begins in May, and continues till Oct. In this season, synchronous with the S.W. monsoon of the Bay of Bengal, when Southerly winds blow more steadily and with greater force than usual, from June until late in Sept., there are no land-breezes; at other times, brisk sea-breezes prevail from S.W., and S. in the day, and variable breezes from land or from the N. at night. Ships coming from sea in this monsoon should, if bound to Bencoolen, or any other place well to S. of the Equator, endeavour not to fall in with the coast to the N. of their port, for several days may be lost in reaching it when Southerly winds prevail. The *Herculean*, bound to Bencoolen, fell in with the Pogy Islands so late as the 18th of Sept., and was seven days getting to her destination, the winds being constantly from the S.E. Although the S.E. or Southerly monsoon prevails most on this coast to the S. of the Equator, North-Westers are liable to blow for a few days at times, particularly about the F. or C. of the moon. These N.-Westers are more common in N. latitude, with Southerly currents and frequent calms, rendering the navigation by the Inner Passage close along the coast very tedious and troublesome; more particularly as ships are in many places obliged to anchor in the night, on account of surrounding dangers; also in the day, by the prevalence of faint breezes, calms, and contrary currents. The *Royal George*, bound to Malacca Strait and China, left Padang July 1st, and proceeded along the coast by the Inner Passage: she made very slow progress; N.W. winds and S. currents made frequent anchoring so indispensable, that it was the 12th before she reached the equator, and the 6th of August when she got to Acheen Head. The frigate *Bombay* and *Lady Castlereagh* in company, were all July and part of Aug. getting from Bencoolen along the coast to the N. by the Inner Passage; had they run out from Bencoolen to the S.W. for 100 m., they should (with the S.E. trade-wind) have made 700 or 800 m. of Westing; and then, with the S.W. winds, a fair run to Acheen Head, about a fortnight's passage.

The N.W. Monsoon, on the W. coast of Sumatra, particularly in S. latitude, prevails from Oct. to April; in some seasons N.W. winds begin early in Oct., but from this month to mid-Jan. they usually are strongest, attended often by much thunder, lightning, and rain. In March the hard rains abate, and the weather becomes more favourable. When the land and sea-breezes prevail on this coast, which may happen at times in either monsoon, the sea-breeze sets in between 10 a.m. and noon, subsequent to a calm, and declines with the setting sun. The land-breeze begins early in the night, and continues until 8 or 9 o'clock in the morning, subject to many irregularities. To the S. of the equator, unsettled land-winds, squally weather, and rain, prevail greatly in the night during the N.W. monsoon; with sea-breezes at N.W. and W.N.W., or perhaps W., in the day, veering to W.S.W. and S.W. about mid-March, or early in April. In most parts of India to the N. of the equator, the N.E. monsoon prevails when the sun is in the S. hemisphere, but on the W. coast of Sumatra it is changed to a N.W. monsoon by the direction of land. From Dec. to April the weather is often settled and fine in N. latitude, with land and sea-breezes; at other times, particularly in the springs, N.-Westers prevail, which blow stronger than any other winds upon this coast. They generally produce a considerable sea, rendering it hazardous to ride at anchor in the open roads on the coast; and it is very difficult to work to the N. whilst they continue.

The *Alfred*, bound to Penang and China, left Bencoolen in Oct.: having a Southerly wind at

starting, she steered to the N., intending to pass out into the open sea, between the N. end of Se Beroo and Pulo Mintao. The wind shifted to N.W., with frequent hard squalls, much rain, intervening calms, and Southerly currents; with this unfavourable weather very little progress was made to the N., and many of the people being disabled from duty by the heavy rains, they were obliged, after seven days' loss of time, to bear away, and pass out, round the S. of the islands, opposite Bencoolen. It seems advisable at all times for large ships, bound from Bencoolen to Malacca Strait, to steer to the W. far outside of all the islands; there, in both monsoons, they will certainly get much quicker to the N. by keeping in the open sea than by following any of the inside routes.

THE CURRENT on the W. coast of Sumatra is influenced greatly by the winds, and seldom runs to the N., in either monsoon, except when the wind is blowing strong from S., which will happen at times, particularly in S. latitude. When N.W. winds prevail, the current runs with the wind to the S.E., and it generally sets in this direction along the coast in both monsoons, particularly in N. latitude. To the N. of the Equator, when the current is setting to the S. betwixt the coast and islands, it is frequently at the same time running to the N. in the open sea, far outside of them. In Oct., Nov., and Dec., it is often tedious getting to the N., particularly from the Equator to Acheen Head, for baffling N.W. winds and S. currents are often found to extend a great way out from the coast in these months; particularly in channels among the large islands in the offing, the current sets to the S. and S.W.; but in June and July, between Analaboo and Acheen Head, the current has been found to set to the N.W., from 20 to 30 m. per day. To the S. of the Equator, when at times the Southerly winds blow with strength from June to Oct., a drain of current is impelled to the N., at which times it is rather tedious and difficult to work to the S. along the coast. The rise of tide on most parts of the coast does not exceed 2 or 3 ft. in the springs; and in places not far distant from the Equator it is H. W. about 6 h. at F. and C., or when the moon is in the horizon. There is generally a considerable surf on most parts of the coast, highest in the Southerly monsoon, during spring-tides.

Ships leaving Malacca Strait in Oct. or Nov., when Westerly winds prevail, should follow the track recommended for ships bound out in the S.W. monsoon, that they may benefit by the W. set on the coast of Pedir, and among the islands, or at least avoid the current running into the Strait in the offing. The *Thames*, in Nov., bound out of the Strait to Europe, had the winds from S.W., with a current setting in between Pulo Rondo and the South Nicobar, which prevented her getting out to the S. of the latter; she was therefore obliged to stand to the N.W., and passed out betwixt Car-Nicobar and the Little Andaman: from thence she made a good passage to St. Helena. The *Camden*, from Penang Island, could not get out to sea between Pulo Rondo and the Nicobars, owing to light winds, and currents setting into the Strait, and she was obliged to run back to Penang, in Nov., to get an additional supply of provisions. The *Rockingham* and fleet, in Nov., sailed from thence through the Bengal Passage, with a current setting out of it, and on the following day, having been close-hauled with the wind at W.S.W. and S.W., made the Nicobar bearing W. $\frac{1}{4}$ N., distant 8 leagues, the current having run 44 m. to the N.E. during the 24 hours. (See Current Chart, and Remarks upon Currents.)

ISLANDS FRONTING THE W. COAST OF SUMATRA.

The Cocos Islands (the N. one), in lat. $8^{\circ} 1' N.$, about lon. $95^{\circ} 18' E.$, bearing W. by N. 8 leagues from the N.W. end of Hog Island, are two small low islands, covered with trees, separated by a channel $1\frac{1}{2}$ m. wide, probably not safe, as breakers project a little way from the islands, with islets or rocks close to the N.-most. The channel, between the N. end of Pulo Simaloe and the Cocos, should be approached with great caution in a large ship; as, on a shoal-bank, described to extend about 4 leagues to S.S.E. from the largest Coco, the ship *Jane* steering to the N.E., shoaled suddenly to 7 and $6\frac{1}{2}$ fathoms. The *Greyhound's* journal also shows that the channel is dangerous, unless a ship borrow towards Hog Island, and that if a ship stand in to the E., and the S., between Hog Island and the Cocos, she ought never to bring the S. Coco to the N. of N.W., unless her distance from it is above 4 leagues.

PULO SIMALOE, or BABIE, formerly called **Hog Island**, the N.-most of the large islands fronting the W. coast of Sumatra, distant from it 22 leagues, extends nearly N.W. by W. and S.E. by E. about 18 leagues; and is about $3\frac{1}{2}$ leagues broad, high, hilly, covered with trees, and may be seen 9 or 10 leagues. The N.W. point is in lat. $2^{\circ} 57' N.$, about lon. $95^{\circ} 42' E.$; the E. point in lat. $2^{\circ} 26' N.$, lon. $96^{\circ} 26' E.$: the S. point in lat. $2^{\circ} 19' N.$, lon. $96^{\circ} 22' E.$ On both sides of Hog Island there are sudden overfalls on several coral patches that lie 1 or 2 leagues off shore. On one of these, which bears about S. from the S.W. point, there are very irregular soundings, from 30 and 20 to 7 fathoms, or probably less water; about $2\frac{1}{2}$ m. outside one islet

that fronts the E. end of the island there is a 2-fathoms coral shoal, with 80 fathoms no ground close to it. As there is no inducement for a ship to stop at this island, nor any safe anchorage about it known to navigators, they seldom or never land there, although it is probable there may be a harbour within some of the islets that line its E. side. About 4 or 5 m. to the W. of the N. point of island, and 2 m. from two islets off that part, lies a coral shoal, with 4 or 5 fathoms, or perhaps less water. The *Baring* experienced strong N.W. winds and S. currents late in Dec., which prevented her from gaining ground to the N., on the W. side of Hog Island; but, after passing round its S. extremity, the wind was favourable for proceeding to the N., and no S. current in coasting along the E. side of the island.

Islets near Simaloe. Several islets lie near shore on both sides, and 4 leagues from the S. point, lie the two Flat Islands, or **Pulo Tapak**; betwixt them and the S. end of Hog Island there is a good passage, about $3\frac{1}{2}$ leagues wide, having no soundings at 70 fathoms, within 2 m. of the N.-most Flat Island, in lat. $2^{\circ} 10' N.$; but the ship *Baring* found 26 fathoms in mid-channel. The water in general is deep near these islands, but with the N. part of the N. island bearing W. $\frac{1}{2}$ S., $2\frac{1}{2}$ m. off, the ship *Suffolk* passed over part of a coral shoal; the rocks plainly seen under the ship's bottom; but the hurry of tacking prevented sounding till about in 11 to 15 fathoms; but it was supposed that there were not more than 4 or 5 fathoms; and farther towards the islands the water appeared more shoal.

Pulo Tapak N.W. point is in lat. $2^{\circ} 11' N.$, lon. $96^{\circ} 32' E.$; and their S. end is about 3 leagues to S.E. of that, or in lat. $2^{\circ} 3' N.$

PULO BANYAK, or BANIA, distant 14 leagues E.S.E. from the S. end of Hog Island, consist of two principal islands with a channel (4 m. broad) between; one lying to the N.E. of the other, with several islets near them. From the S.E. side of the E.-most, or large island, a chain of islets and some shoals project considerably; but by keeping near the Banyaks, there is a safe channel between them and **Passage Island**, which lies to the E. of the chain. (See page 605). At the N. end of Great Banyak there is a bay, in lat. $2^{\circ} 13' N.$, with coral shoals and a group of islands fronting it; there is a passage into it betwixt the two W. islands, and shelter inside, with 16 to 9 fathoms, water; a ship may also anchor outside these islands, but the soundings are very irregular, and the bottom generally coral. The N. end of Great Banyak and the adjoining islands that form this bay bear nearly E. by N. from the Flat Islands, and there is a channel between them 8 leagues broad. On the N.-most Banyak Island there is a peaked hill like a sugar-loaf. The S. end of the **S.W. Banyak** is in lat. $1^{\circ} 59' N.$, and lon. $97^{\circ} 8' E.$; Kamelion Bay, lying to the E. and N. of this, affords good shelter from N.-Westerly winds; the island is safe all round, except one known rock off the W. end.

Passages. There is a passage betwixt the first and second islands that lie off the S.E. end of the Great Banyak, with irregular soundings in it, corally bottom; and third, or Middle Island, round and high, of the same appearance as the second, lies to the S. of it 4 m.; there are various depths in a safe passage betwixt them, generally from 36 to 28 and 19 fathoms, by keeping nearly in mid-channel. Ship coming from the N.W., if bound direct to Tappanooly with a fair wind, may steer for these islands, and pass to the S. of them, or between the two S.-most, then proceed to the E., to pass 2 leagues to the N. of Bird Island; thence a direct course may be steered for the N. entrance of Tappanooly Bay. Some persons adopt the channel about 5 leagues to the N. of Pulo Banyak, and from thence steer E., to go between Passage Island and the coast, as the channel between Pulo Banyak and Hog Island, on either side of the Flat Islands, is safe. That between the Banyaks and the N. end of Pulo Nias, is equally safe: but the channel to the S. of Pulo Nias is considered the best when bound to Tappanooly with Southerly winds.

Pulo Oujong Batoe, the N.E. Banyak, lies 10 m. to N.E. of the Great Island; it is surrounded by a reef, and a cluster of islets lie to the S. of it. Passage Island (see page 605) bears E. by N., 11 m. from Batoe; the channel between them lies $\frac{1}{2}$ way from the latter. **Pulo Rongi-beh**, the S.E. islet, is in lat. $2^{\circ} 10' N.$, lon. $97^{\circ} 28' E.$; and the sea for at least 5 leagues to S.E. appears clear of danger.

PULO NYAS, or NIAS, the largest island off the W. coast of Sumatra, extends nearly in a S.E. direction for 25 leagues, and is 4 to 10 leagues in breadth. The N. extreme bears S. from Pulo Banyak $9\frac{1}{2}$ leagues, and 9 m. to N.E. by N. of this extremity lies the small island **Pulo Baby**, in lat. $1^{\circ} 42' N.$, lon. $97^{\circ} 25' E.$, with a 17-fathoms bank close to it on the S. side, and a safe channel between it and the N. end of Pulo Nyas. Many islets line the shores of Pulo Nias at different places; some on the W. side, stretch out about 3 leagues; of these the N.-most cluster, **Pulo Boenga**, in lat. $1^{\circ} 12' N.$, lies 12 m. S. by E. from the N.W. point of Pulo Nias, and shoals have been found between them; there is said to be also a shoal at 3 m. from the N.W. part of Boenga. Although the coast is steep in some places there is anchorage inside the group of small

islands on the S.W. side, at the entrance of Seirombo River. Also close to the S. point there is good anchorage in an excellent bay, where bullocks, buffaloes, goats, and poultry are plentiful, and water easily procured. The natives are not considered to be of so treacherous a character as the generality of Malays. There is anchorage inside the islands and shoals at the mouth of Nias River: there are also other places where a ship might anchor occasionally, on the N.E. side, and betwixt the E. and S. points of the island. There is a fine river about S.S.W. from Pulo Baby, where a ship may anchor in 10 or 11 fathoms, about N. from the river. In general the land is high, well clothed with trees, and partly cultivated by the natives for rice; this island is well inhabited; according to Dutch accounts having above 150,000 souls; the people are of small stature, and fairer than those of the adjacent coast; the women as slaves were formerly in great demand at Batavia and other Dutch settlements; to which from 500 to 600 of the natives, annually purchased here, were carried away in small vessels. The islanders are a semi-civilised and agricultural race. The Malays, who rule over them, are but few in number, and live principally at Sitolie, on the N.E. coast, in lat. $1^{\circ} 18' N.$

The N. Point, Oujong Lojang, is in lat. $1^{\circ} 32' N.$, lon. $97^{\circ} 19' E.$, and a deep bay forms to the W., in the bottom of which Lapuw Village stands, giving its name to the bay, and sheltered by Pulo Pandjang and other islets. **The W. Cape of Pulo Nias**, called **Oujong Lebang**, is in lat. $1^{\circ} 25' N.$, lon. $96^{\circ} 58' E.$, and Pulo Boenga lies 12 m. to S. $\frac{1}{2}$ E. of this; **Seroemboe**, or Seirombo Village, is 40 m. to S.E. of Lebang. The *Dragon* brig, from Bengal, bound to New South Wales, touched at Seirombo for refreshments in June; and, as might be expected at that season, a heavy surf then rolled over Seirombo Bar. Silorongang Village lies in a small bay faced with coral rocks, which render the inside of them smooth for proas; to the S. of the village, fresh water is got from a small stream in the same bay.

The Nakko group of islands, fronting Seirombo Bay, shelters it in a measure from the sea; but as some sand-banks lie on the W. side of the islands, it may be prudent to pass on the E. side of them in coming from the N., then sail into the bay. In approaching from the S., the bay may be entered without difficulty, as the S. channel is safe; but two shoals, which break at times, lie nearer to Pulo Ache than to the other side of passage, which require caution in coming from the S. To the N. of the N.W. point of Seirombo Bay lies a large shoal, for which a good look-out is requisite in coming from the N., and 10 fathoms is a good track to round the point. The Nakko Islands lie 25 m. to S.E. of Boenga Islands. Breakers were reported by the *Lady Barlow* as seen from her poop, on about a W.S.W. bearing, and 6 leagues from the Nakkos.

The E. coast of Pulo Nias has moderate depths, with good anchorage, and some fine rivers; especially one in lat. $0^{\circ} 54' N.$, where trade is carried on in proas: many isles line the coast here, as on the W. side; but the sea being more smooth on the E. coast, this part of Pulo Nias is certainly the safest.

Samsama Island lies in lat. $1^{\circ} 1' N.$, lon. $98^{\circ} 1' E.$; it is 2 m. off the E. extreme of Pulo Nias, and Sambawa Islet lies 2 leagues off to S.E. by S.; shoal water extends off this coast of Nias nearly half-way to Sumbawa; and a shoal is marked on the charts at 5 leagues to S. of that islet, and about 2 leagues off the E. coast of Pulo Nias.

The shoals between Pulo Nias and the main land of Sumatra have been mentioned at page 608.

Thornhill Bank, off the S. end of Pulo Nias, sounded upon in the *David Scott*, had 18 fathoms, sand and shells, with Pulo Nias bearing from N. to N.W., distant from nearest shore 8 m. It seems probable that the supposed danger, *Lady Barlow Breakers*, might be the effect of strong currents or tides, producing rippings like breakers, but it will be proper to keep a good look-out in this situation.

Pulo Simoe, in lat. $0^{\circ} 4' S.$, lon. $97^{\circ} 57' E.$, is 13 leagues about S. by E. of Pulo Nias, and may be reckoned as the W. island of all the Batoe Group.

The BATOE ISLANDS are the group lying to S.E. of Pulo Nias, and off the shore of Natal and Ayer Bangies (see page 610); they are little frequented by merchant ships, but a trade in dammer and other forest products is carried on by coasters from Sumatra. **Tanah Massa**, the central and largest island, formerly called *Nantian* by the English and **Pulo Mintao** by Portuguese, but the native name of which is said to be **Batoa**, is the next largest island to the S.E. of Pulo Nias, extending from lat. $0^{\circ} 1' S.$, lon. $98^{\circ} 23' E.$, in a S. by E. direction, to lat. $0^{\circ} 46' S.$, being about 15 leagues in length and 2 in breadth. This, like the other large islands, is moderately elevated and hilly, covered with trees, and many small islands line its shores, both on the E. and W. sides, with moderate depths among them, and some of them form safe bays or harbours, unknown to Europeans. The N.E. point of the island is a bluff, with a reef projecting $\frac{1}{2}$ m. from it; and a few miles to the S., on the E. side is formed a bay, called **Lams Bay** by the Dutch in lat. $0^{\circ} 5'$

S., where the *Greyhound* packet lay several days in March, and procured a few poultry, pigs, and cocoa-nuts at a dear rate from some natives, who came from the N. part of the island; the water got in a creek on the Mintao shore was brackish.

Numerous Islands lie off the N. and W. sides of Tanah Massa; of these, Pulo Memong is the N.-most, which lies 3 leagues to W. of Pulo Pinie, and 3 leagues due N. from the N.W. point of Tanah Massa. Lago Islet lies nearly mid-way from the latter island to Pinie; the only safe channel being between Lago and Pinie. **Pulo Biang**, the N.W. Island of the Batoe Group, is in lat. $0^{\circ} 5' N.$, lon. $98^{\circ} 15' E.$; to the S. of it comes **Pulo Lorang** (whose centre is cut by the Equator), with an islet half-way towards Biang. Between Lorang and the principal island there are two or three more, and plenty more farther S. **Pulo Sigata**, the S.W.-most of these, has its S. end in lat. $0^{\circ} 15' S.$, which is 20 m. to S.E. by E. of Pulo Simoe. Padang boats are said to go annually to Mintao for dammer and oil. These W. islands are little known and dangerous to approach, being lined with reefs and high breakers, and no soundings near them. **Tanah Ballah** is a large island (the mere outline of which is faintly drawn on the charts), lying between Tanah Massa and **Pulo Bodjo**; this last is about a league from the S. point of Ballah, and is a small, sloping island, situated in about lat. $0^{\circ} 44' S.$, lon. $98^{\circ} 26' E.$; said to have soundings of 30 or 40 fathoms between it and the point, with reefs 9 m. to the S.E. and S., in lat. $0^{\circ} 50' S.$, between it and the N.W. end of Se Beeroo, or Siberoet.

PULO PINIE, or **BATOA**, but **Cassanie** is said to be the name given to it by natives, 3 leagues to the N.E. of the N. end of Tanah Massa, or nearly mid-way between it and Natal, is of considerable extent, stretching nearly E. and W. 6 leagues, having some islets and shoals off its S.E. end for 8 m., which have been already mentioned at page 609; and a chain of islands and shoals extends from it over toward Tanah Massa. The S. end of Pinie bears E. by N. from the N.E. point of Tanah Massa. Off the N.E. part of Pinie, a coral reef extends off shore nearly 5 m. A ship coming from the W., and bound to Natal, may proceed through the great channel formed between the S. end of Pulo Nias and these islands, leaving Tanah Massa and Pinie to the S. This channel is safe, with a good look-out, but the prudent navigator will be cautious when near any islands during the night, as they are not yet sufficiently explored.

Siberoet Strait, between the large island of that name and Pulo Badjo, is deep and safe (so far as yet known), and forms the best passage in the N. monsoon for approaching Padang, on the coast of Sumatra, from the open sea. When N.W. winds prevail, a ship steering for it ought to keep well to the N., and make the S. end of Pulo Bodjo, then steer to the S.E. for the N.W. part of Siberoet, to give a berth to the reef between them; afterwards, she may keep within 3 or 4 m. of the N. side of the latter island, in steering to the E. through the channel; a stranger, however, ought not to run through it in the night, unless in necessity. The ship *Hermes*, of Calcutta, was unfortunately wrecked on the reef that bounds the N. side of the channel, by not keeping over towards the N. end of Siberoet. The *Cornelia*, by keeping within 4 m. of this island, carried regular soundings of 20 and 19 fathoms through the channel; and the breakers on the mid-channel shoal were only seen from mast-head.

The MENTAWIE ISLANDS. Siberoet, formerly called **Se Beeroo**, or **North Pora**, and **Great Fortune** by the Dutch, extends nearly N.N.W. and S.S.E. 22 leagues, the N.E. point being in lat. $0^{\circ} 56' S.$, lon. $98^{\circ} 57' E.$, and from this the N.W. point bears W. by S., distant 7 leagues, and that bears nearly S.E. from Pulo Bodjo, distant 7 leagues, which is the breadth of Siberoet Channel; but directly in the middle of it there is a reef of breakers, very extensive; the brig *Olive Branch*, in passing to the S. of it, saw breakers extend towards the Batoe Islands as far as could be discerned from the mast-head, and the S. part of them seemed to be about mid-channel between Tanah Ballah and Se Beeroo. The N.W. point of Siberoet is in lat. $1^{\circ} 0' S.$, and about 7 leagues to W. by S. of its N. point, forming the S. side of the channel. Although little frequented, this appears to be a good channel, convenient for ships bound from the W. to Padang, being opposite to that place. Siberoet is generally high land, covered with wood, higher in the middle than towards the sides, with a sandy beach in many parts, and a great surf breaking often upon shore. On the N.E. side some small islands are said to lie a little way off; others are situated near the S.W. side and S. point: betwixt these and the principal island there is a channel, with regular soundings from 16 to 20 fathoms. The snow *Jenny* went through between the small islands and Siberoet. A ship intending to proceed to the Sumatra coast, by the Siberoet Channel, and having been forced to leeward of it by the N.W. winds, may occasionally pass through the *Seaflower* Strait to the S. of the latter. On the S.W. side of Siberoet there are white cliffs a little to the N. of the N.W. island that forms the channel; and this island has breakers and foul ground stretching from it to the N.W. and W.

Lipa, the S.W. island off Siberoet, is in lat. $1^{\circ} 53' S.$, lon. $99^{\circ} 6' E.$; and the S. extremity

of the great island itself is about 4 m. more to the N. The S. point of West Island, off the S.E. point of Siberoet, is in lat. $1^{\circ} 56' S.$, lon. $99^{\circ} 21' E.$

Seaflower Channel, between the Islands Siberoet and Sipora, is bounded on the W. by West Islet, and another called Karamatyl, off the S.E. point of Siberoet; and on the E. side by the Islets Po Renda and Setan near the N. end of Sipora. These islets bear about E. by S. and W. by N. from each other, distant 13 m. The channel is 9 m. wide, clear of danger; and no soundings at 30 fathoms in passing through. The Siberoe Islands is the name given by the Dutch to those that form the S. side of this channel. **Setan, the N. island**, has its N.W. point in lat. $1^{\circ} 57' S.$, and lon. $99^{\circ} 32' E.$, and Hurlock Bay lies to S. of this.

SIPORA, or SE PORA, or SIKABOU, extends from about lat. $2^{\circ} 0' S.$, nearly S.E., to Cape Marlborough, in lat. $2^{\circ} 25' S.$, lon. $99^{\circ} 47' E.$, which is the S. point of the island, it being 11 leagues in length, and nearly half that breadth at the N. part, tapering gradually to the S. extremity. It is mostly covered with wood, and rather less elevated than Siberoet. Both these islands are distant from 17 to 19 leagues from the coast of Sumatra. A little E. of the N.W. point of Se Pora, and directly S. of Setan Island, is **Hurlock Bay**, with soft ground in it, and moderate depths for anchorage; and a narrow channel leads from it to an inner bay or harbour, farther inland to S.W. The outer bay being open to N.E. winds, the inner one must be preferred; and in passing through the narrow channel, the starboard shore should be approached more closely than the opposite side, which is rocky. This harbour is sheltered from all winds inside the point on the starboard side, where there is a red, sandy beach, and anchorage in 8 to 10 fathoms, or in 5 or 6 fathoms close to shore: the depths in the narrow passage going in are from 4 to 6 or 7 fathoms. From Cape Tilleroo, the N.E. extreme of the island, to the entrance of Hurlock Bay, a reef projects a great way out from shore.

The E. coast of Se Pora extends from Cape Tilleroo S.S.E. $8\frac{1}{2}$ leagues to Cape Marlborough, and in this space there are two considerable bays; Se Ooban Bay, $2\frac{1}{2}$ leagues to the S. of Cape Tilleroo, and Se Labba Bay, 7 m. more to the S. **Se Ooban Bay**, in lat. $2^{\circ} 12' S.$, may be known by a large tuft of trees on the starboard side going in; the course into it is S.W., and a ship should keep in mid-channel, in from 24 to 30 fathoms, to avoid rocks projecting from the points on each side. There is a brook of fresh water at the N.W. part of the bay, but the best anchorage is in the S. part, with the point on the S. side the entrance bearing about N.E., in moderate depths, from 8 to 12 or 14 fathoms. **Se Labba, or Sikityie Bay**, is known by a round, peaked hill, close to its S. side, called Turk's Cap, in lat. $2^{\circ} 18' S.$, seen from both sides of the island. In entering this bay, the course is about S.W., and the depths 45 and 40 fathoms, decreasing to 14 or 12 fathoms, inside. Rocks project from both points, but farthest from that on the S. side, which must have a good berth in passing. There is a coral shoal nearly in the middle of the bay, even with the water's edge, to the S. of which the bottom is muddy, and proper for anchorage. At either of these bays a ship may be supplied with wood, water, a few hogs, yams, some poultry, and cocoa-nuts, from the people of the few straggling villages on this side of the island. Between Capes Tilleroo and Marlborough, the E. coast of Se Pora is generally steep, but rocks project a considerable way from shore in some places, particularly to the S. of Turk's Cap; and from abreast of it soundings extend along the coast towards Cape Marlborough, in lat. $2^{\circ} 25' S.$, lon. $99^{\circ} 47' E.$, which is bluff and moderately elevated, fronted by rocks $1\frac{1}{2}$ m. off shore.

The W. Coast is also rocky, with some small islands adjoining, and the sea breaks high upon the shore; but the W. side is said to be destitute of inhabitants. Two of these islands, about 4 leagues to the W. of Cape Marlborough, lie close to shore, and near each other: they are low and flat, covered with cocoa-nut trees, and rocky to sea-ward.

Sipora Strait, the channel between the S. end of Se Pora and N. Pager Island, is about 3 leagues broad, and safe; there are soundings from 20 to 40 fathoms on a coral bank that stretches across betwixt the islands, when Turk's Cap and Cape Marlborough are in one, bearing about N.W. by N.; and farther to the E. there is no ground. About 4 m. S. by E. $\frac{1}{2}$ E. from Cape Marlborough, in the recently published chart, a shoal is said to exist $1\frac{1}{2}$ m. N. and S. by 2 m. E. and W.

NORTH PAGER, formerly called **N. Pogy, or N. Nassau Island**, is $6\frac{1}{2}$ leagues long from N. to S., and two-thirds in breadth; the N. point, called Cape Cuddalore, being in lat. $2^{\circ} 31' S.$, lon. $99^{\circ} 57' E.$, and bearing S.E. from Cape Marlborough on Se Pora, distant 11 m. The S. point, in lat. $2^{\circ} 51' S.$, forms the W. side of Sikakap Strait, which separates the N. and S. Pogy Islands from each other. They are both high, covered with wood, and may be seen 14 or 15 leagues. On the W. coast of N. Pogy there is a group of islets, with passages and anchorage between the N.-most of them, called Pulo Laubo Laubo; but the best channel to the anchorage is round the N. end of this Island, from which projects a reef; and on the E. side, betwixt the Island and the Pogy shore, is the road, where a ship may anchor in 12 or 13 fathoms, sheltered from all winds.

excepting those that blow from the N. **Se Laubo Laubo**, or **Silaboe Yaboe Village**, is situated on the side of a rivulet at the S.E. side of the bay, where water may be procured. **Battoo Mongo**, another village, lies near the S.W. point of the Island, which is low land, and from thence to the S. entrance of the **Sikakap Strait**, the coast stretches nearly E. about 3 leagues, and is rocky, with high breakers upon the shore.

Sikakap, or **Se Cockup Strait** runs up to N., then curves round to N.E., containing very small islets at the S. part, and throughout the channel, which, although safe, is not a mile wide in some places. The passage to enter from the S., is between the Island **Pulo Serasso**, contiguous to N. **Poggy**, and two called **Pulo Supaw**, near S. **Poggy**, by keeping in mid-channel; and on the W. side of the other islands inside, where the depths are from 10 to 15 fathoms. Along the N.W. point of S. **Poggy**, throughout the Strait, there are small bays or coves, with soft bottom and regular soundings, where a ship may occasionally anchor out of tide: for it runs 3 knots, at times, in middle of the passage. **Se Cockup River** is opposite the N.W. point of S. **Poggy**, on the W. shore, where fresh water may be procured; and the village of that name is several miles up river: there is also fresh water under the high land at N. **Poggy** S.E. point, which forms the N. side of entrance of the Strait. This entrance is very narrow, the small Island **Tongo** being mid-way; and the points and islands having rocks projecting a little from them; but there are 20 fathoms in middle of the narrow passage betwixt the island and S. **Poggy** Point. A little outside the Strait, about $\frac{1}{2}$ m. E. from the point on the N. side, there is a reef of rocks, even with the water's edge.

Pulo Serasso, in lat. $2^{\circ} 50' S.$, lon. $100^{\circ} 6' E.$, at the S. end of Strait, is separated from N. **Poggy** by a very narrow channel, with from 5 to 10 ft. water in it; fronting which there is a small island, having a rock upon it resembling a thatched house when viewed from the S.W. The sea breaks with great violence upon the rock, and upon the low rocky shore to the W. Captain J. C. Ross anchored in this Strait, and cut a new foremast for his ship, the *Borneo*, near the shore of N. **Poggy** Island, of an excellent species of timber; called *katooka* by natives; and although the size required was 68 ft., the chief difficulty was to find a tree small enough, those of inferior size near shore having been cut down by the natives, to split into planks for the **Padang** and **Bencoolen** markets, where the timber of late years has come into repute. The first tree cut down measured 97 ft. below the branches, and 28 in. diameter at the smallest part; and this being too large, Captain Ross was obliged to select a smaller one: the mast formed of this tree was carefully examined in Aug., 1826, whilst the *Borneo* was lying in the river Thames, and found to be perfectly sound. He says that the shores of this Strait furnish the best and most conveniently obtained spars of any place known in those seas. The natives assisted in cutting the spar, and getting it on board, and thought themselves amply remunerated by a present of coarse cutlery, beads, and small checked handkerchiefs, of about 10 dollars' value altogether.

SOUTH PAGER, or **S. NASSAU ISLAND**, extends from **Sikakap Strait**, in lat. $2^{\circ} 45' S.$, about S.E. by S. $12\frac{1}{2}$ leagues, to the S. point, in lat. $3^{\circ} 20' S.$, about lon. $100^{\circ} 24' E.$, and it is from 2 to 4 leagues in breadth. Several small islands lie contiguous to the W. coast, but the coast itself does not appear to have been examined at all. On the E. side, 4 leagues to the N. of S. point of island, four small islands form a circular group, with a harbour inside; the channel between the two N.-most islands has 10 fathoms in it, and there are from 6 to 14 fathoms inside the harbour. This is generally called S.E. Harbour, which is the only place of shelter on the E. side of S. **Poggy**; but **Laboe an Dyan Bay**, in lat. $3^{\circ} 5' S.$, seems to afford some shelter from S. winds. Soundings extend along it to the N. point, where a vessel may occasionally anchor, opposite to some of the small villages. The sea-coast of the **Poggy Islands**, in several places where the land is low, abounds with cocoa-nuts; some small spots have been planted with pepper vines, but the natives are averse to labour. It is said, that on each of the three large islands, N. and S. **Poggy** and **Se Pora**, there were about 800 inhabitants when Captain Forrester was there. The tide among these, and the other islands which form the chain, rises from 3 to 5 ft. in the springs; but currents often run with the prevailing winds.

Soeman and Mongo, are two small islands, situated to the E. of South **Poggy**. **Mongo** lies 10 m. N.E. of its S. point; and to the S.E. about 15 m. off, stands **Sandion Island**, formerly called **Larg**, in lat. $3^{\circ} 29' S.$, lon. $100^{\circ} 38' E.$ A small, round island, with trees on it, lies close to the E. side of **Larg**, joined to the reef which surrounds them. **Bergen** is distant from **Larg** $4\frac{1}{2}$ leagues, and the channel between them is safe. There appear to be some **Coral Banks** to the W. of **Sandion**, very little known, probably not dangerous. The *Europa*, steering E.S.E. to pass to the S. of **Sandion**, had ground 33 fathoms, next east 17, 10, 8, and 4 fathoms; she then hauled off S.W., and deepened in half an hour to 65 fathoms, no ground. When in 4 fathoms, upon this coral shoal, the E. point of **Sandion** bore E. by N. about 3 leagues. Until this shoal is better known, it will be prudent to keep 4 leagues from the W. side of **Sandion**, in steering to pass it to the S.

The *David Scott*, Captain Thornhill, in May, had 25 fathoms, hard bottom, the centre of Sandion or Larg bearing N.W., distant at least 3 leagues, and the small isle off the E. end of Larg N.N.W. $\frac{1}{2}$ W. about 10 m.; being nearly calm, sent the boat to sound at 2 or 3 cables from the ship, and she found the same bottom. As other coral spots may probably exist in the vicinity of Larg, not yet discovered, it seems prudent to give this island a good berth on all sides. The channel between Larg and S. Poggy seems wide and safe, by the account of the *Addington*, which ship passed through it.

Trieste Island, in lat. $4^{\circ} 3' S.$, and lon. $101^{\circ} 3' E.$ (centre), may be seen about 5 leagues from the deck of a large ship. It is small, extending $2\frac{1}{2}$ m. N.E. and S.W., nearly surrounded by reef; but there is a coral bank of soundings stretching 3 or 4 m. from it on the W. side, and also on the E. side, where a vessel may anchor occasionally in 25 or 30 fathoms, if drifted near it by the current during calm weather; and some fresh water may be got upon the island in the rainy season. With Trieste bearing N.N.E. about 12 m., the *David Scott* had soundings from 65 to 85 fathoms, when passing. The channel between this island and Larg is spacious and safe.

ENGANO, the S.-most of the large islands fronting the W. coast of Sumatra, and distant from it 19 leagues, is 5 leagues in extent from E. to W., of irregular form, having a level appearance when viewed far off, and seen about 7 or 8 leagues from the deck. It is fortified by a rocky shore, with high breakers mostly all round, the rocky ledges projecting out 2 or 3 m. in some places, with irregular soundings about a league farther out, over a bottom of coral rock. **Engano Bay**, on the E. side, to the N. of the S.E. point, is inside four small islands, with anchorage over a sandy bottom, and shelter from most winds in the upper part of it, which extends considerably into the land. The islands are surrounded by rocks, except the innermost small sandy one, which has 8 or 4 fathoms close-to, on the inside, and anchorage near it, over a sandy bottom. The channel leading into the bay is betwixt the two outermost islands, having 18 fathoms in mid-channel, and 7 to 4 fathoms, white sand, inside, between the inner island and the N. point of bay, and here it is narrow and bounded by rocks. To the N. of the bay there is a small stream of fresh water, but the landing in most parts is difficult; it abounds with good timber, fine fish, yams, and cocoa-nuts. Her Majesty's ship *Dover* grounded near Amsterdam Island, the largest of those fronting the bay. Whilst watering here, the crews of the *Dover's* boats were attacked by natives, and several of the people speared.

The S.E. point of Engano is in lat. $5^{\circ} 30' S.$, lon. $102^{\circ} 19' E.$; and the mid-channel entrance into Engano Bay lies 4 m. to N.E. of that point. The island is well inhabited by people nearly of the same colour, but stouter and more active, than the Malays. They go without clothing, and are armed with spears, made of hard wood, pointed with bone or iron, which they use for striking fish; they have canoes that carry six or eight men. The N. coast is bold, having no soundings from 3 to 5 m. off; the beach consists mostly of sand, but in some places the shore is rocky.

From the N. point, in lat. $5^{\circ} 18' S.$, the coast extends E.S.E. 10 m. to a point, and from this another point bears S.S.E., 2 m. At 2 m. to S. of the latter lies North Island, covered with trees, and, excepting a small opening on the W. side, it is surrounded by a coral reef, partly dry at L. W., but having deep water close-to all round. South Island, distant 2 m. S. by W. from North Island, is also covered with trees, and surrounded by a reef, excepting the W. side, which has a sandy beach bold to approach. The entrance lies between these two islands. Middle Island, about 2 m. W. by N. of S. Island, is very conspicuous from the sea, having a high sandy beach, with a tuft of trees on the centre. A reef extends from this island to the S.S.E. and E., but it is bolder to approach on the N. and W. sides. Sandy Island, bearing N.N.W., less than $\frac{1}{2}$ m. from Middle Island, is not more than 6 ft. above the sea, and a reef projects from it both to the E. and W.; but on the N. side it is bold, with 8 fathoms close to the beach. The reef of the main island projects far out towards Sandy Island, rendering the passage narrow, though perfectly safe, the reefs being steep-to on both sides, with 10 and 11 fathoms in the channel. The passage between Sandy and Middle Islands is still narrower, with 11 fathoms, water, and equally safe. The passage between Middle and South Islands has 16 and 17 fathoms, and is also safe, by keeping near to South Island until it bear to the N.E. Between South Island and the low S.E. point of the main island, there is no passage even for a boat. The passage between North Island and the main island should not be attempted, as the reef extends far out from the coast, rendering the passage very narrow. Outside of Middle and Sandy Islands there is shelter from the prevailing winds in either monsoon, in 12 to 14 fathoms, sand, good anchorage; and plenty of wood may be got from either of the outer islands: but as water can only be procured in the inner bay, to the N. of the village, a ship requiring a supply should anchor there, to protect her boats and people, the natives being treacherous. A vessel may anchor in 4, 5, or 6 fathoms, sand and mud, within little more than a mile of the creek, keeping nearest the S. shore, in most places a sandy beach, bold to

approach, the trees growing quite into the water in some parts. The S.E. point of Engano is low and sandy, covered partly by a range of Palmyra trees. The reef projects from this point 2 m. to the E., and joins that from South Island, having very high breakers. The S. point, $7\frac{1}{4}$ m. W. from the S.E. point, projects in an acute angle, having, about a mile distant to the S.E., a pyramid or black rock, about 8 ft. above water. Between these points the coast forms a concavity, fronted by the coral reef, at 1 to $1\frac{1}{4}$ m. distant, on which the sea breaks high in many places. In sailing along this part of the coast at 4 m. distance, no danger appeared from the masthead, excepting the reef which is steep-to.

The W. point, in lat. $5^{\circ} 24' S.$, lon. $102^{\circ} 5' E.$, bears from the S. point about N.W., distant 9 m.; but the coast between them forms a concavity, having a small island near it, surrounded by a coral reef to sea-ward, projecting above $\frac{1}{4}$ m., with high breakers. Here the land is higher, seems better cultivated, and has more inhabitants than any other part of the coast. The coral reef that fortifies this coast must be very dangerous to approach in strong S.W. winds. From the W. point, the N. part of island bears N.E. 8 m., the coast between them forming two intermediate points, from which the reef projects above a mile, with soundings near it from 35 to 25 fathoms. Soundings of 35 to 15 fathoms are obtained on most parts of the S. coast, at the distance of $\frac{1}{4}$ m. to 2 m. from the reef. Formerly ships steering for Sunda Strait during the N.W. monsoon, when not certain of their longitude, endeavoured to get a sight of this island.

SUNDA STRAIT.

Sunda Strait* has two channels, which lead into it from the W., the small channel between the W. end of Java and Princes Island, and the great channel to the N. of this island, betwixt it and the S. Coast of Sumatra.

The S. Coast of Sumatra, between the Flat Point on the W., and Tanjong Toca or Hog Point on the E., occupies 70 m. of longitude, and is indented by two large bays, the shores of which are fronted by numerous islands and rocks.

SEMANKO, or KEYSER BAY, formed between Cape Rada, or Ketyl (formerly called Tanjong Chinna) on the W., and Tanjong Tekoos on the E., indents the land about 10 leagues in a N.W. direction, and is 6 leagues wide at the entrance, having various depths, from 40 to 100 fathoms, decreasing to 10 and 15 fathoms inside. Along the W. shore, and at the upper part, the anchorage is good over a muddy bottom, but exposed to the S.E. winds. Tampan Bay is only an open bight, 3 m. to the N. of Chinna Point, but the ground is good for anchoring about a mile from the shore in 12 or 15 fathoms. The village of Borne stands at the N.W. angle of the Bay, near the mouth of a rivulet, the water of which is said to be good; boats, however, will find it difficult to enter. There appear to be other rivulets along the head of the Bay to the E.; the shores are generally low, and the land marshy near the sea, but in some places there are pepper plantations. To the N. of the Bay stands a high, conical mountain, called Pamanka, or Pemanco Peak, 7,400 ft. high, in lat. $5^{\circ} 25' S.$, lon. $104^{\circ} 41' E.$; and to the E., between it and Lampoon Bay, there are other mountains, the highest of them called Lampoon Peak, or Deba, in lat. $5^{\circ} 30' S.$, lon. $104^{\circ} 52' E.$, and about 6,500 ft. high. These mountains are discernible a great way at sea in clear weather, by ships approaching Sunda Strait. There is a rocky shoal near Betong, or Poelou Point, which projects more than a mile in the offing.

Pulo Laboean, formerly called Tubooan, or Keyser Island, situated in mid-entrance of the bay, is high, bold, and safe to approach, the channel on either side of it being spacious and clear of danger; but the water is deep, and the bottom rocky in some places. On the N.E. side of the island there is anchorage in 15 or 16 fathoms, sandy bottom, about a mile from shore; and near the E. point there is a salt-water creek, having 6 ft. water at the entrance, with fresh water at its head, where a supply may be procured. There are some pepper plantations on the island, and tall trees at the E. end, fit for masts.

Kalang-bayang Harbour, or Caloombyan, on the E. side of Keyser Bay, is small, but safe, sheltered from all winds, with sufficient depths of water for large ships, and well adapted for a fleet in want of refreshments, as every supply may be obtained, and the delay in the S.E. monsoon would not be so great here as at Batavia. This Harbour lies nearly E.N.E. from the high part of Keyser Island, and may easily be discerned by Pulo Eyoe and Pulo Clappa, two small islands lying about a mile outside, having a safe channel with 25 fathoms, water, between them. Mount Kalang-bayang, or Tanka, is a fine land-mark to E. by N. of the harbour, in lat. $5^{\circ} 45' S.$, lon. $105^{\circ} 7' E.$, and about 3,400 ft. high. The inner harbour is convenient for the native trade, as small vessels can

* The Dutch Government have placed coast lights between the channels of Sunda and Banks Straits.

load and unload alongside the beach, and the village is $\frac{1}{2}$ m. from the landing-place, situated in a valley, apparently a healthy spot. To sail into the harbour in the N.W. monsoon, enter by the W. passage formed between Pulo Clappa and the N. point, Tanjong Napal, where the depths are from 30 to 22 fathoms. In the S.E. monsoon, enter between Pulo Clappa and Pulo Eyoe, if you have a steady breeze. The E. passage between Pulo Eyoe and the main is only safe for small vessels: both the islands are bold, having 22 fathoms, water, close to them. The **Rover Rocks** lie nearly $\frac{1}{2}$ m. off the S. point of the Harbour. To clear them, when abreast of Pulo Clappa, the S. point of Keyser Island should be kept just open to the S. of Pulo Clappa; and with this mark, steer in till Oogooron Point bears N., which forms the N. side of entrance of the inner harbour; then anchor in 9 or 10 fathoms, black mud; but in all parts of the Harbour a ship may safely anchor, there being no invisible danger. In the N.E. part of the bay, fresh water may be obtained from a small rivulet. **Kiloang Bay**, which lies about 5 m. S.E. of Kalang-bayang Harbour, also affords safe anchorage in 13 fathoms, and may be known by the island of Tonkalie, near the E. point of the Bay, and visible 12 m. The land to the E. of this Bay is very high.

LAMPONG, or LAMPOON BAY, formed between Tanjong Tekoos on the W. and Rajah Bassa on the E., is very extensive, being 7 leagues wide at entrance, stretching N. into the land nearly the same distance. From Tanjong Tekoos the Lagoendy chain of islands extends 8 m. to the E., having channels betwixt some of them, and between them and the point, with soundings from 40 to 20 fathoms. Other islands line the W. shore of the Bay inside, between which and the main there are several good roads, or places of shelter, with villages opposite to them on the main. The excellent Admiralty chart of Sunda Strait (*scale* about 4 m. to 1 in.) should be in the hands of any ship-master who may come here.

Lagoendy Strait, formerly called **Goondy**, the W. entrance into Lampong Bay, is about 2 m. wide; separated into two channels by the small island of Sussarat, and both are said to be free from danger; with adverse winds or currents good anchorage may be found to the E. of Sussarat in 10 or 12 fathoms. The general soundings in the Strait vary from 20 to 40 fathoms, but being extremely deep outside, large ships are liable to embarrassment on account of eddy winds from the high land, accompanied at times by strong currents, with a leading land-breeze in the morning; however, a ship might run out through it with safety.

Lagoendy Islands. On the N. side of Pulo Lagoendy a small bay is formed, called Nangga Harbour, with the little Island Pulo Patappan in middle, on the E. side of which is the best passage into harbour, by borrowing near the shore of Pulo Lagoendy. Here the depths are from 15 to 10 fathoms, and there are from 12 to 7 fathoms inside the harbour, where a ship might moor secured from all winds, and careen if necessary. The late Admiral Owen careened H. M. S. *Baracouta* here. **Mangoman Island** is nearly 1 m. to N. of this bay, or $1\frac{1}{2}$ m. to E. of Sussarat.

A coral reef, with only 12 ft., and 13 fathoms around it, lies about 1 m. to the N. of the W. end of Mangoman Island; the reef is about 75 yards long, and cannot be distinguished by discoloured water. Another reef lies in lat. $5^{\circ} 40'$ S., about 2 m. to N.E. of Pokowang Island; and others lie at the head of Lampong Bay; one reef is 15 yards in extent, with from 5 to 8 fathoms near it: readily recognised by discoloured water. The chart is the best guide.

Tims Islet, in lat. $5^{\circ} 50'$ S., lon. $105^{\circ} 24'$ E., stands about a league to the E. of the Lagoendy Islands, and may be counted as one of them.

Rajah Bassa Road, situated directly under the high land called Refreshment Head, that forms the E. side of Lampong Bay, has frequently been visited by homeward-bound China ships, it being an excellent place for procuring good water with facility, and other refreshments; but the landing is dangerous with W. winds, as the coast is enveloped with breakers. The anchorage is between the Tiga Islets (the Three Brothers) and the reefs which line the shore, in from 12 to 16 fathoms, blue mud. Large ships ought not to anchor under 11 or 10 fathoms; for, although the soundings decrease regularly over a soft bottom to 7 or 8 fathoms in general, yet the shore is fronted by a rocky bank, which projects to 5 or 6 fathoms in some places, and is very steep-to. The water deepens to 25 and 27 fathoms towards the Three Brothers, which lie about 4 m. W. by N. from Cocoa-nut, or Klapper Point; and there are 18 fathoms in the channel between the Middle and South Brothers. These three islets appear as one in coming from the E., and do not begin to open until Rajah Bassa Road is approached. The depths from Rajah Bassa Road across Lampong Bay to Pulo Lagoendy are from 13 to 19 fathoms, regular soundings and good anchorage. Rajah Bassa N.W. Peak is nearly 4,400 ft. high. The S. extreme of Rajah Bassa Road, called Cocoa-nut Point, is low, with cocoa-nut trees overhanging it, from whence the coast trends E., forming a concavity between it and Hog Point; the land is rather low near the latter, but rises gradually to an elevated peak about a league E. of Cocoa-nut Point. In the bight there are two islets surrounded by reefs, and the soundings in it are from 25 to 15 fathoms, decreasing to 10 and 8 near shore.

approach, the trees growing quite into the water in some parts. The S.E. point of Engano is low and sandy, covered partly by a range of Palmyra trees. The reef projects from this point 2 m. to the E., and joins that from South Island, having very high breakers. The S. point, $7\frac{1}{2}$ m. W. from the S.E. point, projects in an acute angle, having, about a mile distant to the S.E., a pyramid or black rock, about 8 ft. above water. Between these points the coast forms a concavity, fronted by the coral reef, at 1 to $1\frac{1}{2}$ m. distant, on which the sea breaks high in many places. In sailing along this part of the coast at 4 m. distance, no danger appeared from the masthead, excepting the reef which is steep-to.

The W. point, in lat. $5^{\circ} 24' S.$, lon. $102^{\circ} 5' E.$, bears from the S. point about N.W., distant 9 m.; but the coast between them forms a concavity, having a small island near it, surrounded by a coral reef to sea-ward, projecting above $\frac{1}{2}$ m., with high breakers. Here the land is higher, seems better cultivated, and has more inhabitants than any other part of the coast. The coral reef that fortifies this coast must be very dangerous to approach in strong S.W. winds. From the W. point, the N. part of island bears N.E. 8 m., the coast between them forming two intermediate points, from which the reef projects above a mile, with soundings near it from 35 to 25 fathoms. Soundings of 35 to 15 fathoms are obtained on most parts of the S. coast, at the distance of $\frac{1}{2}$ m. to 2 m. from the reef. Formerly ships steering for Sunda Strait during the N.W. monsoon, when not certain of their longitude, endeavoured to get a sight of this island.

SUNDA STRAIT.

Sunda Strait* has two channels, which lead into it from the W., the small channel between the W. end of Java and Princes Island, and the great channel to the N. of this island, betwixt it and the S. Coast of Sumatra.

The S. Coast of Sumatra, between the Flat Point on the W., and Tanjong Toca or Hog Point on the E., occupies 70 m. of longitude, and is indented by two large bays, the shores of which are fronted by numerous islands and rocks.

SEMANKO, or KEYSER BAY, formed between Cape Rada, or Ketyil (formerly called Tanjong Chinna) on the W., and Tanjong Tekoos on the E., indents the land about 10 leagues in a N.W. direction, and is 6 leagues wide at the entrance, having various depths, from 40 to 100 fathoms, decreasing to 10 and 15 fathoms inside. Along the W. shore, and at the upper part, the anchorage is good over a muddy bottom, but exposed to the S.E. winds. Tampan Bay is only an open bight, 3 m. to the N. of Chinna Point, but the ground is good for anchoring about a mile from the shore in 12 or 15 fathoms. The village of Borne stands at the N.W. angle of the Bay, near the mouth of a rivulet, the water of which is said to be good; boats, however, will find it difficult to enter. There appear to be other rivulets along the head of the Bay to the E.; the shores are generally low, and the land marshy near the sea, but in some places there are pepper plantations. To the N. of the Bay stands a high, conical mountain, called Pamanka, or Pemanco Peak, 7,400 ft. high, in lat. $5^{\circ} 25' S.$, lon. $104^{\circ} 41' E.$; and to the E., between it and Lampoon Bay, there are other mountains, the highest of them called Lampoon Peak, or Deba, in lat. $5^{\circ} 30' S.$, lon. $104^{\circ} 52' E.$, and about 6,500 ft. high. These mountains are discernible a great way at sea in clear weather, by ships approaching Sunda Strait. There is a rocky shoal near Betong, or Poelou Point, which projects more than a mile in the offing.

Pulo Laboean, formerly called Tubooan, or Keyser Island, situated in mid-entrance of the bay, is high, bold, and safe to approach, the channel on either side of it being spacious and clear of danger; but the water is deep, and the bottom rocky in some places. On the N.E. side of the island there is anchorage in 15 or 16 fathoms, sandy bottom, about a mile from shore; and near the E. point there is a salt-water creek, having 6 ft. water at the entrance, with fresh water at its head, where a supply may be procured. There are some pepper plantations on the island, and tall trees at the E. end, fit for masts.

Kalang-bayang Harbour, or Caloombyan, on the E. side of Keyser Bay, is small, but safe, sheltered from all winds, with sufficient depths of water for large ships, and well adapted for a fleet in want of refreshments, as every supply may be obtained, and the delay in the S.E. monsoon would not be so great here as at Batavia. This Harbour lies nearly E.N.E. from the high part of Keyser Island, and may easily be discerned by Pulo Eyoe and Pulo Clappa, two small islands lying about a mile outside, having a safe channel with 25 fathoms, water, between them. Mount Kalang-bayang, or Tanka, is a fine land-mark to E. by N. of the harbour, in lat. $5^{\circ} 45' S.$, lon. $105^{\circ} 7' E.$, and about 3,400 ft. high. The inner harbour is convenient for the native trade, as small vessels can

* The Dutch Government have placed coast lights between the channels of Sunda and Banks Straits.

load and unload alongside the beach, and the village is $\frac{1}{4}$ m. from the landing-place, situated in a valley, apparently a healthy spot. To sail into the harbour in the N.W. monsoon, enter by the W. passage formed between Pulo Clappa and the N. point, Tanjong Napal, where the depths are from 30 to 22 fathoms. In the S.E. monsoon, enter between Pulo Clappa and Pulo Eyoe, if you have a steady breeze. The E. passage between Pulo Eyoe and the main is only safe for small vessels: both the islands are bold, having 22 fathoms, water, close to them. The **Rover Rocks** lie nearly $\frac{1}{4}$ m. off the S. point of the Harbour. To clear them, when abreast of Pulo Clappa, the S. point of Keyser Island should be kept just open to the S. of Pulo Clappa; and with this mark, steer in till Oogoron Point bears N., which forms the N. side of entrance of the inner harbour; then anchor in 9 or 10 fathoms, black mud; but in all parts of the Harbour a ship may safely anchor, there being no invisible danger. In the N.E. part of the bay, fresh water may be obtained from a small rivulet. **Kiloang Bay**, which lies about 5 m. S.E. of Kalang-bayang Harbour, also affords safe anchorage in 13 fathoms, and may be known by the island of Tonkalie, near the E. point of the Bay, and visible 12 m. The land to the E. of this Bay is very high.

LAMPONG, or LAMPOON BAY, formed between Tanjong Tekoos on the W. and Rajah Bassa on the E., is very extensive, being 7 leagues wide at entrance, stretching N. into the land nearly the same distance. From Tanjong Tekoos the Lagoendy chain of islands extends 8 m. to the E., having channels betwixt some of them, and between them and the point, with soundings from 40 to 20 fathoms. Other islands line the W. shore of the Bay inside, between which and the main there are several good roads, or places of shelter, with villages opposite to them on the main. The excellent Admiralty chart of Sunda Strait (*scale* about 4 m. to 1 in.) should be in the hands of any ship-master who may come here.

Lagoendy Strait, formerly called **Goondy**, the W. entrance into Lampong Bay, is about 2 m. wide; separated into two channels by the small island of Sussarat, and both are said to be free from danger; with adverse winds or currents good anchorage may be found to the E. of Sussarat in 10 or 12 fathoms. The general soundings in the Strait vary from 20 to 40 fathoms, but being extremely deep outside, large ships are liable to embarrassment on account of eddy winds from the high land, accompanied at times by strong currents, with a leading land-breeze in the morning; however, a ship might run out through it with safety.

Lagoendy Islands. On the N. side of Pulo Lagoendy a small bay is formed, called Nangga Harbour, with the little Island Pulo Patappan in middle, on the E. side of which is the best passage into harbour, by borrowing near the shore of Pulo Lagoendy. Here the depths are from 15 to 10 fathoms, and there are from 12 to 7 fathoms inside the harbour, where a ship might moor secured from all winds, and careen if necessary. The late Admiral Owen careened H. M. S. *Baracouta* here. **Mangoman Island** is nearly 1 m. to N. of this bay, or $1\frac{1}{4}$ m. to E. of Sussarat.

A coral reef, with only 12 ft., and 18 fathoms around it, lies about 1 m. to the N. of the W. end of Mangoman Island; the reef is about 75 yards long, and cannot be distinguished by discoloured water. Another reef lies in lat. $5^{\circ} 40'$ S., about 2 m. to N.E. of Pokowang Island; and others lie at the head of Lampong Bay; one reef is 15 yards in extent, with from 5 to 8 fathoms near it: readily recognised by discoloured water. The chart is the best guide.

Tims Islet, in lat. $5^{\circ} 50'$ S., lon. $105^{\circ} 24'$ E., stands about a league to the E. of the Lagoendy Islands, and may be counted as one of them.

Rajah Bassa Road, situated directly under the high land called Refreshment Head, that forms the E. side of Lampong Bay, has frequently been visited by homeward-bound China ships, it being an excellent place for procuring good water with facility, and other refreshments; but the landing is dangerous with W. winds, as the coast is enveloped with breakers. The anchorage is between the Tiga Islets (the Three Brothers) and the reefs which line the shore, in from 12 to 16 fathoms, blue mud. Large ships ought not to anchor under 11 or 10 fathoms; for, although the soundings decrease regularly over a soft bottom to 7 or 8 fathoms in general, yet the shore is fronted by a rocky bank, which projects to 5 or 6 fathoms in some places, and is very steep-to. The water deepens to 25 and 27 fathoms towards the Three Brothers, which lie about 4 m. W. by N. from Cocoa-nut, or Klapper Point; and there are 18 fathoms in the channel between the Middle and South Brothers. These three islets appear as one in coming from the E., and do not begin to open until Rajah Bassa Road is approached. The depths from Rajah Bassa Road across Lampong Bay to Pulo Lagoendy are from 13 to 19 fathoms, regular soundings and good anchorage. Rajah Bassa N.W. Peak is nearly 4,400 ft. high. The S. extreme of Rajah Bassa Road, called Cocoa-nut Point, is low, with cocoa-nut trees overhanging it, from whence the coast trends E., forming a concavity between it and Hog Point; the land is rather low near the latter, but rises gradually to an elevated peak about a league E. of Cocoa-nut Point. In the bight there are two islets surrounded by reefs, and the soundings in it are from 25 to 15 fathoms, decreasing to 10 and 8 near shore.

The Bezee Channel, betwixt this island and Krakatoa, having regular soundings from 18 to 28 fathoms, mud, and being about 2 leagues wide, where ships can occasionally anchor to stop tide, or otherwise, is often preferred to the Great Channel, particularly by ships working out against the Westerly monsoon. The **Hindostan Rock**, on which the ship *Hindostan* struck, is the only known danger; it is of spiral form, being only 6 or 8 ft. in diameter, with 15 ft. water on its summit, and 10 fathoms close-to. About half-way between it and the *bushy* S.E. point of Pulo Bessy, the depths are 8 and 10 fathoms, and it is distant from the S. end of this island about $1\frac{1}{4}$ m. From the Hindostan Rock, the extremes of Pulo Bezee bore about N.E. by N. to about N.W. by N., and Zee Klip, or Gap Rock, well open to the S. of Keyser Island. Dutch Navy officers searched for this rock, but without success, though they found another shoal with $5\frac{1}{2}$ fathoms, least water, consisting of hard rock and coral, and having all round 6 to 13 fathoms, soft mud and clay, and at some distance 19 fathoms. Some of their bearings agree with the former, and it is probable that the rock is on the same shoal. Boom Rock lies off the S. part of Bezee, $\frac{1}{3}$ m. distant.

Zee Klip (Sea Rock) is a small group, in lat. $5^{\circ} 59' S.$, lon. $105^{\circ} 23' E.$, consisting of two or three steep pyramidal rocks, and lying about 5 m. to the W. of the S. end of Pulo Bezee, and N. $\frac{1}{4}$ E. 7 m. from the W. point of Verlaten Island; the largest of these, having a cleft in it, is called sometimes Gap Rock. To avoid the Hindostan Rock, a ship ought to keep at least 2 m. from the S. end of Pulo Bezee, but the best mark in proceeding through this channel is never to bring the Gap Rock open to the S. of Keyser Island.

PULO SEBOOKO, or SAMBOORICO, in lat. $5^{\circ} 52' S.$, lon. $105^{\circ} 33' E.$ (E. point), lies to the N.N.E. of Pulo Bessy, having a safe channel, nearly a mile wide, between them, and it is situated nearly mid-way between the latter and the S.E. point of Rajah Bassa Road: it is high, covered with wood, and some islets and rocks lie contiguous to the N. and E. sides, with good anchorage off the E. part of the island, in 10 or 12 fathoms, near the Shelter Islets. A reef projects a little way from the S. end of island; and another from the W. part, nearly 2 m., very steep-to, but not dangerous, because the W. rocks of this reef rise to a height out of water, with a slight resemblance to Zee Klip. On the N. side there are 30 fathoms, water, between Sebooko and the Three Brothers, which passage seems to be safe, although not frequented. Close to the E. side of Sebooko lies Beschutter, or Shelter Islet, which is high on the E. side, with a reef on its S. side, and forms with Sebooko a small bay, with 15 to 19 fathoms, water, affording good anchorage for proas. A coral rock mid-channel between the E. point of Sebooko and the N. point of Beschutter, renders it dangerous to enter this little bay from the N. with W. gales; but there is a good road for large vessels in 11 and 13 fathoms, 1 or $1\frac{1}{4}$ m. from Sebooko, close to the E. side of Beschutter Islet.*

THWART-THE-WAY, or Middle Island, called Pulo Renyang by the Malays, stands in middle of Sunda Strait, being $2\frac{1}{4}$ m. long, and elevated 450 ft.; the N.E. end in lat. $5^{\circ} 57' S.$, lon. $105^{\circ} 51' E.$, and it lies 4 m. to S.E. of the Zutphen Islands, with Stroom Rock nearly mid-way between. A reef projects a little way from the S. side of it, on which a rock, above water, is visible, and the bottom is generally rocky near this island, with inconvenient depths for anchoring: there being from 40 to 50 fathoms about a league to the N. of it, but less water near its S. and S.W. sides. The channel between Thwart-the-Way and Sumatra is much frequented in the Westerly monsoon, by ships from Banka Strait bound to the W., being shorter, although more contracted, than the other channel betwixt Thwart-the-Way and Java. The N. channel may be adopted with a steady wind, for in such case, with the W. current, a ship will get speedily through; but in light baffling winds, she is liable to be drifted about by strong tides or currents near the Stroom Rock, where is no anchorage, except in deep water, from 40 to 60 fathoms. A temporary anchorage lies on the S.W. side of Thwart-the-Way, with the N.W. point bearing from N. to N.N.W., and the S. point from E.S.E. to S.E. by E.

Stroom Rock, $1\frac{1}{4}$ m. to the N.W. of Thwart-the-Way, is a group of three or four rocks, visible above the sea at H. W., and then discernible only at a short distance; at other times it appears about the height of a long-boat, and steep-to. Although the passage betwixt this rock and Thwart-the-Way is safe, the channel to the N. is preferable, by keeping within $1\frac{1}{4}$ m. of the Zutphen Islands when the wind inclines from the Sumatra side, and giving a berth to the rock off Hog Point. The Stroom Rock, Button Island, and Bantam Point, are nearly in one.

* We anticipate the day when Sunda Strait shall be the great frequented highway between the Red Sea and the Asiatic Archipelago. Then we shall require a *coaling station*; perhaps between Krakatoa and Long Island; perhaps near the Zutphen; perhaps at Merak Harbour on the Java shore.

SOUTH SIDE OF SUNDA STRAIT, WITH DIRECTIONS FOR BATAVIA.

PRINCES ISLAND, or **Pulo Panaitan**, separated from the W. part of Java by a channel about 3 m. broad, is the largest island at the entrance of Sunda Strait, being 12 m. long, from N.E. to S.W., and 10 m. broad; the N.E. end is in lat. $6^{\circ} 30\frac{1}{4}'$ S., lon. $105^{\circ} 15'$ E.; the peaked hill at the S.E. side is 1,450 ft. high, in lat. $6^{\circ} 36'$ S., lon. $105^{\circ} 14'$ E.: it is about 2 m. to the E. of Java Head. The middle of the island is hilly, but at the W. end, the land is level and low fronting the sea, and all the island abounds with wood. A reef projects from the W. point to the N.W. and S.E. from 1 to 2 m.; betwixt which and the S. point of island, the Casuaris Bay stretches a great way inland, having soundings of various depths, and anchorage at its upper end; but being open to the S.W., it is not frequented, and little known. The N. side of the island has soundings of 20 fathoms near shore, but the anchorage is destitute of shelter, and too near the land for ships to lie in safety. With the peaked hill on the S.E. part bearing from S.W. to N.N.W., there is anchoring-ground in 36 to 44 fathoms about a mile off the E. shore; and with the same hill bearing from N. $\frac{1}{4}$ W. to W. by N., there are from 10 to 30 fathoms, coarse sand, shells, and coral, little more than a cable's length off shore. Two miles W.S.W. from the S.E. point is a coral reef, close in shore near a conspicuous white rock, and is always discernible by the breakers. The common anchorage, on the E. side of island, is with the Peaked Hill about N.W. by N., where a ship in want of water should anchor, in 35 fathoms, soft ground, about $\frac{1}{4}$ m. from shore. Here is a small sandy bay, and at its E. part a run of fresh water, where the casks must be filled about 100 yards up, the higher the better, otherwise the water will be brackish. It is only during the Westerly monsoon that ships can conveniently procure water here, for the springs are nearly dry in the S.E. monsoon, when there is little rain; the strong winds also, which blow in this season over the W. part of Java, render the anchorage at the E. of Princes Island unpleasant, it being then a lee shore. The rocks, called the **Carpenters**, are most in the way of ships passing betwixt Java and Princes Island. These are a group of large rocks projecting from the S. point of the island nearly a mile, having no anchorage near them, there being 50 fathoms close-to, and about two ships' lengths from them, no ground.

PRINCES STRAIT, the **Behouden**, or Safe Passage of the Dutch, formed between Princes Island and Java, is the small or S. channel leading into Sunda Strait; it was formerly much frequented, and recommended as the best passage both to enter and depart from that Strait; but the preference is now generally given to the Great Channel betwixt Princes Island and Krakatoa, or to that between the latter and Pulo Bezee, with a steady fair wind, unless a ship intend to water at Mew Bay, on the N. side of Java Head, which is more convenient than Princes Island for that purpose. In passing through the Strait, strangers may be warned to keep the Java shore on board, and to anchor when the breeze fails, otherwise they will be drifted to the S.W.

THE N.W. COAST OF JAVA.

Java Head, in lat. $6^{\circ} 47'$ S., lon. $105^{\circ} 11'$ E.; and **Cape Sangian Sira**, the S.W. point of Java, is about 2 leagues to S. by E.; the land inside this Cape forms in separate hills, from 1,000 to 1,400 ft. above sea. (See further remarks at page 647).

First Point of Java, or **Tanjong Along-Ajang**, is the S. point of entrance of Princes Strait, easily known by a remarkable rock off it, called the **Friar**, that lies nearly S.E. by S., about $3\frac{1}{4}$ m. from the **Carpenters**, which bound the other side of the Strait. At some distance to the N. of the First Point, there is another rock above water, which, together with the former, are properly called the **Friars**. The W. end of Java extends $2\frac{1}{4}$ leagues, about N.N.W. and S.S.E., and is steep, high land, projecting a little to the N. of the middle part, which is generally considered as Java Head, already mentioned. The First Point is 2 m. to the N. of the Head, and the coast between them, which forms a bight, is fronted by high rocks in some places stretching out about a mile. On these rocks, and also on the **Friars** and **Carpenters**, the sea breaks high during W. winds, or in bad weather. Ships proceeding through Princes Strait, in the N.W. monsoon, should keep near to Princes Island and the **Carpenters**, particularly in working out against W. winds; a current will then, sometimes, be found setting out in their favour. During the other monsoon, when S.E. and Southerly winds prevail, they ought to keep nearest to Java shore, and the **Friar**, which rock may be approached within 1 or 2 cables' lengths, with a steady S. wind. A ship may sometimes get quickly out to the W. through Princes Strait in the N.W. monsoon, during squally weather, when it would be difficult to beat out to the N. of Princes Island. The *Magdalen* beat out through this Strait, against a W. gale, by carrying a press of sail, and tacking between the squalls, at a time

when the heavy sea made it impossible to tack the ship in the Great Channel between Krakatoa and Princes Island; he was only thirty-six hours from the North Island until clear out of the Strait, while other ships from China anchored for shelter under Krakatoa. The *Elphinstone*, bound to China, entered Princes Strait in the afternoon of the 3rd Aug., and passed through it in the night without anchoring.

Mew Island, called also **Pulo Kanti**, or **Cantae**, situated in Mew Bay, about a league E. of the First Point of Java, is small and hilly, abounding with wood; betwixt it and the First Point there is an islet near shore, called the Mew Stone, and regular soundings over a sandy bottom are found to stretch along this side of Princes Strait. There is a safe but narrow channel betwixt Mew Island and Java, with various soundings from 5 to 8 and 10 fathoms over a sandy bottom, nearest to the island, where a ship may lie land-locked, and be sheltered from all winds. A rocky shoal, lying S. of the island, but nearest to the Java shore, is avoided by keeping nearest to the island; and in every other part, a little nearer the island than mid-channel, is the best track for vessels passing through, or taking shelter here. The shore is rocky on the outside of Mew Island, but safe to approach; the soundings decrease gradually to 8 or 9 fathoms. On the Java shore, to the E. of the island, there is an excellent watering-place, during the Southerly monsoon, preferable then to that at Princes Island, where the wind blows upon shore, and fresh water is sometimes scarce; whereas, here the water pours from the rocks in great abundance, and is of superior quality to that of Anjer, North Island, or the Nanka Islands.

Watering-place. A ship proceeding to the watering-place at Mew Island must give a berth to a reef of rocks, which lies $\frac{1}{2}$ m. to E. of the island, and bears about N. nearly $\frac{1}{2}$ m. from the watering-place. She may run betwixt it and the island, borrowing towards the latter, and anchor in 10 or 12 fathoms inside; or she may anchor farther out in 14 fathoms, water, over a bottom of fine sand, with the N. point of Mew Island about W. $\frac{1}{2}$ S.; off the Java shore about $1\frac{1}{2}$ m., and from the watering-place $1\frac{1}{2}$ m. The *Royal George* and the *Thames* watered here. The *William Pitt* watered here in May; the wood had grown over the cascade, so that it could not be perceived at H. W., but was found by the noise of the water falling into the sea. Mew Island is not inhabited, but ships touching there sometimes procure a small supply of turtle, fowls, and cocoa-nuts, at an exorbitant price, from the people of Princes Island, who bring them over in their proas. Plenty of wood may be got upon the island, or on the opposite shore of Java, near the watering-place. The water is clear and good, and falls in a cascade from the land upon the beach; with the assistance of a hose, it may be filled into boats without landing the casks. Inland, a considerable way from the watering-place, are some huts or villages, but none near the sea on this part of the coast.

Tides. It is H. W. on F. and C. of the moon at about 6 h.

Second Point, or Tanjong Gookoolang, 12 m. N.E. by E. from First Point, may be approached to 15 or 16 fathoms, about a mile distant; and a ship may keep in moderate depths for anchoring, in passing along the coast between them, there being no danger unless near shore. On the E. side of the point, **Welcome Bay** extends 4 leagues into the land, and should be approached with caution, as containing several islets and shoals; a shoal of 12 ft., with 6 fathoms contiguous, lies betwixt Second Point and Tambing Point, $\frac{1}{2}$ m. off shore. The outermost of these shoals, **Panter Reef**, extends N.N.E. and S.S.W. about a mile in length, and is half that breadth, having only 9 ft. water on it in some places; from this shoal, the Second Point bears W. by N. 6 m., then on with the peak of Princes Island, and Mount Paiong (1,500 ft. high) about S.W. by W. About a cable's length outside of it there are 19 fathoms, water, so that care is required not to stand into the bay, in working, when near this shoal; with a fair wind, a direct course should be steered from the one point to the other, without borrowing into the bay. At 2 m. to W. by S., is a rocky ridge mostly above water. A supposed dangerous shoal lies about 2 m. to the S. by E.; and between that and the Java coast there are plenty. The E. side of Welcome Bay is more clear, with good shelter in the S.E. monsoon, but in the Westerly monsoon this bay ought to be avoided. According to Lieutenant Boom, D.R.N., there is safe anchorage in the W. monsoon also (when the wind is not too far N.), behind Second Point in 9 or 10 fathoms.

Third Point, or Tanjong Lussong, in lat. $6^{\circ} 27' S.$, lon. $105^{\circ} 39' E.$, separates Welcome Bay from Pepper Bay, the latter being on the E. side of this point, and bears N.E. $\frac{1}{2}$ N. about $6\frac{1}{2}$ leagues from Second Point. To the E. of the point, there is an islet, Lawungan, inside of Pepper Bay, with shoals to the N.W. 2 m. distant; the N.-most shoal lies E. nearly 2 m. from Third Point, part above water, rendering the approach to it dangerous; much caution is necessary in the navigation of this bay throughout, as the water is generally shoal. A ship being abreast Third Point, about a league off, the small island Seriguy, or **Pulo Papole**, in the N.E. part of Pepper Bay, may be seen bearing about E. by N., but will then appear as part of the contiguous

coast: to touch here, it will be prudent to steer across the bay, keeping the island on starboard bow, and not borrow towards the shoal water near Java shore. A ship may anchor about 2 or 3 m. from Seriguy in 7 or 8 fathoms, with it bearing about S.S.E.; refreshments may be procured from the village on the main, but at high prices. A reef projects from the island about a mile to the N., and stretches from thence to Java shore. **Panyang Reef**, $1\frac{1}{2}$ m. to the W.S.W. of Papole, a mile in extent N.N.W. and S.S.E., is a dangerous ledge with 3 ft. on its shoalest part.

Fourth Point, or Tanjong Ciecorang, about 6 leagues N. $\frac{1}{2}$ E. from Seriguy, or 9 leagues N.E. by N. from Third Point, is low to sea-ward; and most part of the coast betwixt it and Welcome Bay is low, interspersed with hills in some places, and abounding with cocoa-nuts. Two *fixed* lights are now at this point; the highest one (150 ft.) in clear weather may be seen 7 leagues; but the lower one only shows through about two points of the compass in the line of the Electric Cable. In coasting along betwixt Seriguy and Fourth Point, a ship should keep about 3 m. or more from shore, in soundings from 20 to 30 fathoms, to be enabled to anchor, if calms and contrary currents render it necessary. About half-way from Seriguy towards the point, it would be imprudent to borrow too near shore, for reefs stretch out nearly a mile in some places: and from Fourth Point a reef projects about a mile, with 20 fathoms almost close to it. At 4 m. to S. of the same point there is a reef of rocks even with the water's edge, with a channel between it and shore, with $3\frac{1}{2}$ to 4 fathoms, and a sand-bank stretching off from the reef about $\frac{1}{2}$ m., on which the *Catherine* was lost. From the outside of it, in 12 fathoms water, the Button bore N.N.E., Thwart-the-Way Peak due N., and Crockatoa W. a little S. Having entered by Princes Strait, and being abreast Second Point, a vessel should steer a direct course for Fourth Point, which is nearly N.E. from the former about 15 leagues; or having entered by the Great Channel, to the N. of Princes Island, a course should be steered for the same point, if it be intended to stop at Anjer Road, or at Batavia: for it will be prudent to keep near Java Coast during the Southerly monsoon, and pass betwixt it and Thwart-the-Way, whether bound to Batavia or Banka Strait. From Second Point to Fourth Point there is generally good ground for anchoring occasionally, in 18 to 25 or 30 fathoms.

Lights. **Fourth Point**, in lat. $6^{\circ} 4\frac{1}{2}'$ S., lon. $105^{\circ} 53'$ E., now shows two *fixed* lights, the Upper one at 150 ft. above sea, visible in clear weather 20 m. off; but the *Lower* light is only visible between the bearings of S.E. and E.S.E., being only intended to indicate the line of the electric cable, and to prevent ships anchoring near it.

ANJER ROAD is in lat. $6^{\circ} 3'$ S., lon. $105^{\circ} 55'$ E., and $2\frac{1}{2}$ m. to N.E. of Fourth Point. The village or town is not easily perceived in coming from the W., being situated in a bay, where the houses and huts are scattered amongst cocoa-nut trees, nearly obscured by them, and by the chain of hills inland. The E.-most of these is a sharp peaked hill, 1670 ft. above sea, called Anjer Peak, directly over the village, and is on with it bearing S.S.E.; from the S. point of Thwart-the-Way the village bears S.E. Ships frequently touch at this place in the Southerly monsoon to procure refreshments; but the Road is not considered safe nor convenient in the opposite season, for it is *then* dangerous landing, on account of high surf. There is much surf sometimes, even in the Southerly monsoon; in May, the *William Pitt* anchored here, and could not procure any supplies without waiting two days, until they could be brought from the country: and finding it impracticable to get fresh water from shore, on account of a heavy swell rolling into the road, she proceeded to Mew Bay to fill up her water. The *Charles Grant*, bound homeward from China, anchored at Anjer in April; and in the morning parted from all her anchors in a hard gale from the W., was driven on the rocky shore, and did not get off for six days, after being lightened, and with loss of rudder, and otherwise sustaining great injury. This shows that Anjer Road is not safe in the month of April, and should be avoided by homeward bound ships. Buffaloes, some hogs, poultry, vegetables, and frequently turtles, may be procured here; water may be had by employing shore boats. **Light.** On Anjer W. Pier, a *fixed* Red light is now shown, in lat. $6^{\circ} 3'$ S., lon. $105^{\circ} 55'$ E., elevated 23 ft., and visible 4 m. off. In 1860 a signal station was established at Anjer for communicating and receiving messages to or from vessels in the road and in the offing.

The anchorage in Anjer Road is in from 12 to 19 fathoms, N. by W. from the fort, soft ground. Betwixt Fourth Point and Anjer Road the soundings are irregular, and the coast steep, the depths from 30 to 35 fathoms about 3 m. off, decreasing to 8 and 10 fathoms about $\frac{1}{2}$ m. from the shores of Anjer Bay. A ship sailing from or being abreast of Anjer Road, should steer to pass outside the Small Cap and inside the Button, at discretionary distance from either, taking care not to borrow too close to Brouwer Sand in passing: it is 3 m. to N.E. of the Small Cap, and nearly 2 m. off shore; when clear of that shoal and the Button, she may steer N.N.E. for the Two Brothers, if bound to Banka Strait, or to pass Bantam Point within 2 or 3 m., if bound to Batavia or Bantam.

Small Cap, called **Pulo Oelar**, or Snake Island, by the Malays, is a little round isle, bearing N. by E. from Anjer Village $2\frac{1}{2}$ m.; between it and Thwart-the-Way is the proper channel, having various depths in it from 20 to 50 fathoms, over an uneven and generally rocky bottom. There is a passage betwixt the Cap and Java shore, but ships do not proceed through it, on account of Brouwer Sand.

Button, or **Great Cap**, in lat. $5^{\circ} 54' S.$, lon. $105^{\circ} 55' E.$, and 2 leagues N. from the Small Cap, of similar appearance, but larger and higher, is steep, and covered with small trees; about W.N.W. $1\frac{1}{2}$ m. from the Button, is the **Winsor Rock**, with 16 ft. on the shoalest spot, increasing suddenly in every direction. From Anjer Road, nearly to St. Nicholas Point, there is anchorage in 20 to 16 fathoms by borrowing towards the Java shore; but outside, the depths being great, and the bottom unfavourable for that purpose, ships are liable to be drifted about, if the wind fail them, for the tide runs through this narrow part of the Strait with great velocity during the springs. Betwixt Thwart-the-Way and Java shore, and off the Button, the tides or currents set generally strong through the Strait to the S.W. in the S.E. monsoon; and in the opposite direction during the Westerly monsoon.

Brouwer Sand, lies between the Small Cap and Merak Island, and stretches nearly 3 m. parallel to the coast of Java, having a rock called Kroenjo, which partly dries at L.W., about 2 cables' length off shore; and a small passage between it and the shore. It is a dangerous shoal, steep to seaward, there being deep water very near the outside. There are from $1\frac{1}{2}$ to 4 fathoms on it; its S. limit lies $2\frac{1}{2}$ m. N.E. from Small Cap, and its N. end forms a channel of 2 cables wide with Merak Island. To avoid this shoal, a ship should keep nearly in mid-channel between the Button and Java shore, taking care not to bring the Cap in a line with Fourth Point; but always to see the Fourth Point Light-house outside of the Cap.

Pulo Merak Ketyil, or Little Pulo Merak, lies near the shore abreast of the N. end of the Brouwer Sand; and **Pulo Merak Besar**, or Great Pulo Merak, to the N. of it. Between the latter and the main is Merak Harbour, which is nearly $\frac{1}{2}$ m. in extent, having a rock in mid-channel, called Tarremboe, which partly dries at L.W. There is a passage on each side of the rock, with 5 to 10 fathoms water, either of which may be taken by keeping nearer the Merak Islands than to the rock. The anchorage with S.W. winds is due E. from the highest part of the island, and N. of Tarremboe Rock, in 6 to 11 fathoms, soft ground.

The TIDES in the narrow Sunda Strait are greatly influenced by winds, and frequently resemble currents more than regular tides. In Anjer Road the ebb sets often from 1 to 2 m. per hour to the W., during the S.E. monsoon; continuing to run sometimes about 14 hours, with a slack or flood of 6 h. Off Thwart-the-Way and the Button, in the same season it often runs 14 h. at a time to the S.W., from 2 to $3\frac{1}{2}$ m. per hour; then changes, and sets to the N.W., and the N., with much less velocity. At other times the ebb sets about 6 h. to the S.W., and the flood 6 h. to the N.E., with nearly equal velocity, about 3 and $3\frac{1}{2}$ m. per hour, strongest on the springs.

During the Westerly monsoon, betwixt Java and Thwart-the-Way, the tide has been found to run 3 and $3\frac{1}{2}$ m. per hour, at its greatest velocity; the ebb 6 h. to S.W., and the flood the same length of time to the N.E.; but during strong gales from the W., the flood frequently runs longest into the Strait. In this season the tide or current, on opposite side of the Strait, slants off from Sumatra coast about the Zutphen Islands, towards middle of the Strait, or the Java shore; and from Dec to Feb., the ebb tide (or N.E. monsoon current) along Sumatra coast, between North Island and Hog Point, has been experienced to run generally to the S. from 4 o'clock in the morning until 6 in the evening, and the flood weakly to the N. during the night. In Feb. and March a rapid current of 4 to $4\frac{1}{2}$ m. per hour sets sometimes in among the Zutphen Islands to the W.S.W., or round them towards Hog Point, which requires great caution in ships passing those islands, or between Hog Point and the Stroom Rock.

BANTAM POINT, or **ST. NICHOLAS POINT**, in lat. $5^{\circ} 52' S.$, lon. $106^{\circ} 2' E.$, on the Java shore, is a high, bold headland, and bears from the Button E. by N., distant 7 m. Close to shore, on each side of it, there are some small islands, Pulo Tampasa to the S.W., and Pulo Saleira in the bay on the E. side. Soundings off this part of coast are mostly regular, and ships may anchor in some places in 20 fathoms, clay or sand, about 2 or 3 m. to E. of the point. The coast between it and Anjer is high, with indifferent anchorage in the channel until Bantam Point is approached; but there are spots between Brouwer Sand and the Button, where a ship may occasionally anchor to stop tide, particularly towards the Java shore, where the depths decrease in most places. The high land of Bantam Point is very conspicuous; Mount Batoor, the S.W. Peak, 2000 ft. high, stands 2 m. to the E. of Merak Harbour. Mount Gedeh, 2100 ft. above sea, is nearly 4 m. to S.E. by S. of St. Nicholas Point, and looks down upon Bantam Bay.

Pangoriang, a small place about 3 m. to the E. of Bantam Point, has convenient anchorage,

and a small rivulet of good water, where ships may easily procure a supply, and other refreshments may be had at times.

The **Kalie** are two small islands, having a passage of 4 fathoms within them, affording good shelter for small vessels; they lie about half-way between Saleira Island and Kapo Point, the red arid bluff extreme that forms the W. side of Bantam Bay; all the shore is rocky to the sandy bay of Saleira. on the S.E. side of St. Nicholas Point. Pulo Saleira, fronting this bay, is low and woody, with a sandy beach, having 2 fathoms water inside, and 22 fathoms near the outside.

BANTAM BAY is about 8 m. E. and W., and 6 m. N. and S., and contains one large and several small islands with no hidden dangers.

Panyang (Panjang) the large island, is 2 m. in diameter, and lies in the W. part of the Bay. The island is bold to approach on all sides, except off the S. and S.E.; the passage on its W. side is also navigable, and is $1\frac{1}{2}$ m. wide, with variable depths from 5 to 9 fathoms. A small rock lies a cable's length off its S.W. point, with 6 ft. water. Off the S.E. side of Panjang, and very near it, there are two islets, the reefs from which project to the S. $\frac{1}{4}$ m., and ought not to be approached within that distance. The Pulo Kalie islands lie about 1 league W.N.W. from the N.W. side of Panjang. To the S.W. of Panjang there are three small islands, under Java shore, the N.-most may be approached very near, there being 4 and $4\frac{1}{2}$ fathoms, at L.W., 2 or 3 cables off, and this same depth will be found near the two S. islands, at 5 or 6 cables off, shoaling to $3\frac{1}{2}$ and 2 fathoms when approaching them. To the S. of Panjang, 2 or $2\frac{1}{2}$ m. distant, lies a group of islands, called Koebor, Karang-Padang, Lima-jamboe, and Lima-klappa. These islands are surrounded by reefs; and between them, as well as W. from them, and close in-shore, there are several coral banks, for which reason it is advisable, when entering the Bay by the W. channel, and having passed Panjang, to steer about S.E. in 7, 5, and $4\frac{1}{2}$ fathoms, along the N. side of Koebor, the N. Island of this group, to the anchorage. To the E. and S.E. of Panjang there are two islands, called Muyang Besar and Muyang Ketyl (Great and Little Pulo Mady), with a free passage on both sides; but that between these islands and Panjang is preferable, having regular depths from 9 to 5 fathoms, and shoaling toward the anchorage to 4 fathoms. Both Muyang islands may be approached very near, being clear of danger; and when passing to the E. of them, the best way is to keep closer to them than to Java shore, within a mile of which, in some places, there are but 3 fathoms at L.W., while in the other channels from $3\frac{1}{2}$ to 5 will be found.

The anchorage in Bantam Bay for large ships is W.S.W. or S.W. from Muyang Ketyl, and S. from the E. point of Panjang in $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms' depth, at L. W.; and small vessels will find a good road in 3 fathoms, a mile distant from the beach, and $\frac{1}{2}$ m. to E. of Lima-klappa Island. Very near the shore are the two Dua Islands, with the depth of 2 or 3 fathoms near them. The flag-staff of Bantam Fort is in $6^{\circ} 1' S.$, and $106^{\circ} 9' E.$ The mouth of the river is closed by a mud bank, upon which there are 2 fathoms water at 1 m. off, and 1 fathom at 2 or 3 cables from it. In a S.S.W. direction from the Great Panyang, stands the conspicuous hill of Pinang, or Mount Bantam, a good mark for vessels entering the bay. Pontang Point, forming the E. side of Bantam Bay, is bluff, but a reef projects from it $1\frac{1}{2}$ m. This reef is steep-to, as the depths decrease speedily from 8 and 9, to 3 and 1 fathom, and it stretches farthest to E.N.E. from Pontang Point 4 m., where the limit of 3 fathoms lies about E. from the N. point of Panjang Island. When passing along this point, it is advisable not to come nearer than 12 or 11 fathoms, before the E. point of Babie Island is well to the W. of N. by W.

Tides. It is H.W. on F. and C. at Bantam, at about 9h. The mean rise and fall of tide is 2 or 3 ft., and at springs 5 ft.: with neap tides no rise is perceptible. We know little (as yet) of the tides; but the flood of the China Sea from the N., and that of the Java Sea from the E., seem to meet near Gaspar Strait; and there is a third tide that enters Sunda Strait from the Indian Ocean. (See Tide Chart.)

Tanara Bight is formed between Pontang Point and Kaik Point. In the middle of this bight are situated the village and river of Tanara, from whence a reef with a tongue projects 3 m. off, outside which the depths of 2 and 3 fathoms increase speedily to 7 fathoms and more; and the N. point of the tongue, in 3 fathoms at L. W., bears E. $\frac{3}{4}$ S. from Pontang Point, and W. $\frac{1}{4}$ S. from Menscheneter Island. In this bight, close inshore, lies the small island of Tjankier, in a N.N.E. direction, from which, at $\frac{1}{2}$ m. or 1 m. off, there are two coral banks above water.

PULO BABIE ISLAND lies due N. of Pontang Point, and extends about $2\frac{1}{2}$ m. nearly E. and W.; its W. end is in lat. $5^{\circ} 49' S.$, lon. $106^{\circ} 14\frac{1}{2}' E.$, and bears from Bantam Point about E. by N. $\frac{1}{4}$ N., distant 13 m. This island is woody and bold to approach, excepting the E. and W. ends, from which reefs project $\frac{1}{2}$ to $\frac{1}{4}$ m. off. Nearly E. from it, and 10 m. off, lies Pulo Tidong, or Wapen Island, the W. island of the group called Hoorn; this is the largest of the group, and bears about N. $\frac{1}{4}$ W. from Menscheneter Island, distant 3 leagues; and to the S.E. of these the

Great and Little Cambuys are situated. Pulo Babie and these islands, with their adjoining shoals, bound the N. side of the passage leading to Batavia; and the shoals which stretch along Java shore, from the E. point of Bantam Bay, to Menscheneter Point, bound the opposite side of the passage; the coast of Java, in this space, is low near the sea.

Menscheneter Island, (Maneater) near the N.W. end of the reef of that name, is level and low, and bears from Pulo Babie about S.E. by E., distant 16 m., and $3\frac{1}{2}$ m. W.S.W. from the Great Cambuys. Menscheneter Reef projects from Kaik Point about $3\frac{1}{2}$ m. to the N., terminating in a steep sand-bank with rocky patches, on one of which is a beacon without a cross, bearing due E. from the N. point of island. The reef projects a little beyond the beacon, which should therefore be passed at $\frac{1}{2}$ m. off. There is on the N. end of this island a beacon with a round top.

DIRECTIONS FOR BATAVIA.

A Ship bound to Batavia, being abreast of Bantam Point, about 3 m. off, with a fair wind, should steer about E. by S., to pass mid-channel between Pulo Babie and Pontang Point; and through the fair channel about 2 m. to N. of Menscheneter Island, if not affected by an oblique tide which generally sets nearly E. and W. along this part of coast; but if the wind is off the land, a course a little more S. may be requisite. The best track is to keep in 14 and 15 fathoms when a ship is under sail during night, taking care not to borrow under 12 fathoms towards Java shore, nor to deepen above 18 fathoms in the offing. For strangers to run in the night, it may sometimes be imprudent; but they can never be at a loss for anchorage after reaching Bantam Point, there being moderate depths for that purpose from hence to Batavia. Both sides of the channels leading to Batavia Road are now beacons, one side with round tops, the other with conical tops; vessels bound for the road through either of the channels must keep those with round tops on their starboard side, and those with conical tops on their port side. The beacons are all black. When considered necessary, beside the beacons, the borders of any danger will be indicated by a pole or stake.

When the Great Cambuys or Kombuys is approached, the channel becomes contracted, and bounded by shoals, which ought to be passed only in daylight. A beacon with a conical top is erected on the S.W. part of the W. rock lying off the W. side of the Great Cambuys.

Gheribon Rock, surrounded with deep water, lies W.S.W. $6\frac{1}{2}$ m. from Great Tidong (the W. Hoorn Island), and E. by S. $\frac{1}{2}$ S. about 5 m. from Pulo Babie.

Struisvogel, or Ostrich Bank, consists of five different coral rocks, stretching N. and S. $1\frac{1}{2}$ m., and E. and W. $\frac{3}{4}$ m.; on the shoalest places there is 6 ft. at L. W., but close to the bank 13 and 17 fathoms; therefore, it should be approached with great caution; it bears N.W. $\frac{3}{4}$ N. from the middle of Menscheneter, and S. $\frac{1}{2}$ W. from the W. point of Great Tidong. Beacons now mark the N. and S. dangers of this shoal.

Tangara Rock rises suddenly out of 13 and 14 fathoms, mud, having upon its shoalest spot (3 fathoms) a beacon with a conical top, bearing N. by E. from Menscheneter, and W. by N. $\frac{1}{2}$ N. from the Great Cambuys. Half-way between Struisvogel and Tangara, or $1\frac{1}{2}$ m. N.W. $\frac{1}{2}$ W. from the latter, there is another small coral rock called **the Laut**; the least depth upon it is $3\frac{1}{2}$ fathoms at L. W., and close to it, from 12 to 17 fathoms, soft ground.

Serang Shoal. Between Kaik Point and Ontong Reef, there is a bight, in which the depths decrease regularly towards Java shore, except near a rocky shoal off Serang Point, stretching E. and W. 1 m., and having in some places $2\frac{1}{2}$ and 2 fathoms, water. This shoal bears S. from Great Cambuys, and E. by N. from Kaik Point.

Loembong Rock. The reefs which surround the Great and Little Cambuys project very little to the S.; but between these islands lies the dangerous Loembong, a rock only a ship's length in extent, and carrying only $2\frac{1}{2}$ fathoms at L. W. On the middle of it stands a beacon with a conical top, bearing W.S.W. from the S. point of Little Cambuys, and about S.E. by E. from Great Cambuys. To the S. of Little Cambuys there is the **Ander Shoal**, with $3\frac{1}{2}$ fathoms at L. W., on which is a beacon with a conical top, from which the beacon of Mynder Shoal bears E. $\frac{3}{4}$ S., and the N. point of Middelburg, E. $\frac{1}{2}$ S.

Mynder Shoal is $1\frac{1}{2}$ cables in diameter, and has 2 fathoms upon its shoalest part. On the middle of this small shoal there is a beacon with a conical top, from which the N. point of Middelburg bears E. $\frac{1}{2}$ S., the Little Cambuys N.W. $\frac{1}{2}$ W., and Ontong Beacon S.E. by E. $\frac{1}{2}$ E.

Kenappen Shoal, lying S.E. of Mynder Shoal, is small but dangerous, with $2\frac{1}{2}$ fathoms on it at L. W.; and close round it 6 fathoms, which quickly increase to 7 and 9 fathoms. A beacon with a conical top has been placed on this Shoal, from which the beacon at the N. tip of Ontong Reef bears nearly E.S.E., and Mynder Shoal Beacon is in one with the S.W. point of Little

Cambuys; the S. point of Amsterdam just opening clear of the S. point of Middelburg Island, E. $\frac{1}{2}$ S.; and the N. point of Middelburg about E. by N. $\frac{1}{2}$ N.

Besides the last shoal, there are some others to the W. of Middelburg, but none of them in the common track of ships. Upon one of them there is a beacon with a cross,—it is called **Papedjo**, and Middelburg bears from it about S.E. by E. and $\frac{1}{2}$ m. off. A ship beating up along the S. side of the above dangers should consider it as a fair-way mark, not to bring the S. point of Middelburg Island* to the S. of E. $\frac{1}{2}$ N., and to keep the S. point of Amsterdam always well open S. of Middelburg.

The passage betwixt Middelburg and Ontong Reef is very narrow (not quite $\frac{1}{2}$ m.). in 8 or 10 fathoms water. The reef which borders the S. coast of this island is very narrow, and carries a beacon, with a *conical* top, at its extreme ends. Ontong Reef is steep at its N. end, and consists there of a hard sand-bank with some rocks, with only half a fathom at L.W.; the **Beacon** with a *round* top, which stands upon its N. edge, ought not to be approached nearer than in 8 or 9 fathoms. At the E. side, abreast of the island Schiedam, Ontong Reef is more sloping, and may be more nearly approached if the lead be kept briskly going. A ship, after passing Middelburg, should steer S.E., rounding to S.S.E., edging away for Onrust Island, but borrowing on the Java shore into 5 and $4\frac{1}{2}$ fathoms, to avoid the shoals N.W. of Onrust.

Middelburg and Amsterdam Islands lie E. and W. of each other, and about 4 m. to E.S.E. of Little Cambuys. **Schiedam** and **Rotterdam** are other islets more than 2 m. to the S.E.; beyond them lies **Onrust Island**, where the dockyard is, and at 5 m. to S.E. of Middelburg.

Kelor Rock, or the Stone of Onrust, is the W.-most of several small coral rocks which lie off the N. point of Onrust†; they are small and steep-to; and on the shoalest place there are $2\frac{1}{2}$ fathoms near the *conical* top beacon, which stands on its N.W. extremity, about 2 cables N.W. from Onrust, and which must be passed on its W. side. The **Mathilda Rock** lies less than $\frac{1}{2}$ m. W. $\frac{1}{2}$ N. from the former, and carries a beacon with a *round* top, on its N.E. side, in 3 fathoms' depth; but at L.W. there is no more than 2 fathoms upon its shoalest spot. The fair channel runs betwixt these two last rocks, and it is advisable not to pass to the E. of Kelor, nor between the islands of Onrust, Kerkhof, and Purmerend, on which reef a *conical* top beacon is erected. A beacon with a *conical* top is placed on the W. point of the reef to the N. of Kniper Island, on account of the numerous shoals in that space, and a beacon with a *round* top on a rock to the S.W. of same island: also one on **Reigersdaal Shoal**, which is on the shore side of the fair channel, and nearly 2 m. to S. of Onrust. If a small vessel should be working between Schiedam and Onrust, she will have to look out for a small rock, from whence Onrust bears nearly S., and Mathilda Rock beacon S.W. $\frac{1}{2}$ W., it carries 3 fathoms at L.W., but there are $6\frac{1}{2}$ fathoms all round it and close-to.

THE HOORN ISLANDS are four in number, stretching W. by N. and E. by S. about 5 m.; the two W.-most are the Great and Little **Tidong**, and the two E.-most, bearing N. and S. from each other, are called **Pajang Islands**. Each of these groups is surrounded by reefs, partly dry at L.W., and very steep-to outside. The reef round the Tidongs projects but very little to the S.; to the N. about $1\frac{1}{2}$ cables, and to the E. about 3 cables; while that which surrounds the Pajangs projects N. about 6 cables, and to S.E. and to W. some 2 or 3 cables. The soundings to the S. of the Hoorn Islands are (very near them) 30 and 40 fathoms, and in the channel between them and Agenieten Islands, which is fully 2 m. wide, 35 to 50 fathoms.

The **Agenieten Islands** are a little more than $3\frac{1}{2}$ m. to N. of the Cambuys Islands, and are all very small. Pulo Parrie being the largest and E.-most; they are connected to each other by reefs, partly visible above water, and extending in some places $\frac{1}{2}$ m. off. At 1 m. to E. from Pulo Parrie are two small shoals, very near each other, called the **Jonks**, one of which shows above water (is in fact an islet), and upon the other there are 2 fathoms at low tide. The **Panjang di Laut**, is a shoal with 22 ft., about $1\frac{1}{2}$ m. to S. of the E. end of Pulo Parrie. The **Serassa Shoals**, more dangerous, but now said to be buoyed, are 3 m. to S. of Pulo Parrie, and 3 m. to N.E. of the Great Cambuys; making the fair channel between them about 2 m. broad.

Dapoer Island, which lies $5\frac{1}{2}$ m. about E. by N. from Little Cambuys, is surrounded by a reef; and at 2 cables off to N.E. and S. by E. from it, lie two separate coral banks, with $1\frac{1}{2}$ and $2\frac{1}{2}$ fathoms upon them at L.W.: for which reason Dapoer should not be approached within $\frac{1}{2}$ m. on these sides. There is also a group of shoals for fully $2\frac{1}{2}$ m. to the W. and the W.S.W. of Dapoer. The fair middle channel is between them and Middelburg.

Edam Island lies in $5^{\circ} 57' S.$, and $106^{\circ} 50' E.$, on which a *fixed* light is building, to be visible

* On the S. point of Middelburg Island it is *proposed* to exhibit soon a *fixed* Red light, in lat. $5^{\circ} 59' S.$ and lon. $106^{\circ} 41' E.$, visible about 6 m.

† Onrust Island has a dry dock, capable of containing a vessel of large burthen.

about 20 m. At $\frac{1}{2}$ m. to N. of Edam, there is a coral reef of considerable extent, with not more than half a fathom of water. Alkmaar Island is about $1\frac{1}{2}$ m. to S. of Edam; and Enkhuizen 3 m. to S. by W. of Edam, whilst Leiden is 2 m. further to S.E.

The **CENTRAL ISLETS** are Haarlem and Hoorn, which lie between the Outer and Middle Channels. Haarlem is about 4 m. to S.E. by S. of Dapoer; and Hoorn Islet is $1\frac{1}{2}$ m. to S.E. of Haarlem. Monnikendam Reef lies E. by S. from Haarlem Islet, and N. by W. from Hoorn; partly dry at L.W., but has in some places 2 and 3 fathoms. Ayer Bank (15 ft. water,) with a beacon and cross, lies nearly 3 cables to W. of Hoorn Islet.

Various channels exist amongst the islands from Bantam to Batavia, but that adjoining the coast of Java is most frequented by ships of moderate size. The conical and round top beacons used as sea-marks for these channels are about 12 ft. above water, and painted white; they are not very conspicuous, and strangers should be aware that they were often stolen, or washed away by the sea, and were sometimes not soon replaced.

THE OUTER CHANNEL,* is between Pulo Babie and the Tidong Islands, passing to N. of Cheribon Rock; then about an E.S.E. course to pass to the N. of Great and Little Cambuys; and a ship should keep within a mile of the great one, to avoid the Serassa shoal, about 3 m. to N.E. of Great Cambuys. After passing this island, she must edge to the S.E., letting Menscheneter disappear behind Great Cambuys. No part of Menscheneter should be seen to the N. of the latter whilst Little Cambuys bears between S.S.E. and S.S.W., to avoid Serassa shoals. When past them, then steer about E. by N. towards Pulo Dapoer, or Duffen's Islet, keeping it one point on starboard bow. By steering towards it she will pass a 5-fathom patch, and then betwixt two shoals, separated about $1\frac{1}{2}$ m. from each other, on which beacons have sometimes been placed; but the shoals have not always beacons; and it is well to pass to N. of them, by not letting Menscheneter open to the S. of Great Cambuys, till Pulo Dapoer comes to touch Edam Island. The depths in this track are generally about 12, 13, and 14 fathoms. Having passed Pulo Dapoer on the S. side, she must steer to the E. by S. for Edam; and when within a league of it, steer more to S.E., to enter Batavia Road by the Great Channel, leaving Edam and Enkhuyzen to the E., and Haarlam Islet and Hoorn to the W. When Edam Island is approached, the depths will be 13 or 14 fathoms; and a course about S. should then be steered, to pass betwixt Hoorn and Enkhuyzen; when clear of these islands, the dome of Batavia church may be brought to bear S. $\frac{1}{2}$ E., and this bearing continued will carry a ship betwixt Rynland Shoal and the E. reefs directly to the road among the shipping.

Alternative Channels. Ships do not always pass to the N. of the Cambuys when proceeding to Batavia Road, for some pass to the S. of them, avoiding the Ander, the Mynder, and Papedjo shoals: then steer to the E., along the N. sides of Middelburg, Amsterdam, and Haarlam; this, for distinction, we call the **N. Middle Channel**. Betwixt Great and Little Cambuys there is a safe passage; but in adopting this, you should beware of the reef extending upwards of $\frac{1}{2}$ m. from the E. end of Great Cambuys, and the Loembong Rock.

Between Struisvogel (Ostrich Shoals) and the Hoorn Islands, the channel is $4\frac{1}{2}$ m. wide; and those islands may be approached from the S. to within $\frac{1}{2}$ m., as their reefs do not reach farther off than $1\frac{1}{2}$ cables. To the W., however, lies the **Karbau Rock**, about a mile W. $\frac{1}{2}$ N. from the Great Tidong, (the W. Hoorn Island); on the Karbau, there is only one fathom at L.W. A leading mark to pass to the N. of Struisvogel, or Ostrich Shoals, and of the Laut and Tangara Rocks, is to keep Little Cambuys well open to the N. of Great Cambuys. A ship may pass also to the S. of the Struisvogel, between it and Tangara Rock; but in this case the beacon on the latter must be approached within 1 m., on account of the Laut Rock. The passage between Tangara Rock and Great Cambuys is also safe, only taking care to remain fully 1 m. from the W. point of that island, on account of the small coral rocks which project therefrom.

The fair way of the Outer Channel, between the Agenieten and the Cambuys Islands, is close along the N. side of the latter, in order to avoid the Serassa patch of small coral rocks, which lie $2\frac{1}{2}$ m. N. of Little Cambuys, and have $3\frac{1}{2}$ fathoms at L.W. Being so far advanced that Little Cambuys bears S.S.W., steer E.N.E. or N.E. by E. till Dapoer Islet bears E. by S., and then make right for it; because a straight course from the Little Cambuys towards Dapoer would lead among the coral rocks which lie N. and N.W. from Middelburg, on some of which there are not more than $2\frac{1}{2}$ to 3 fathoms, at L.W.

THE INNER CHANNEL,† leading to Batavia, is called **Dutch Channel**, being generally

* On the Admiralty Chart of Sunda Strait, the Outer and Middle Channels are mixed up together, but they must be kept distinct unless the written directions are materially altered.

† The Dutch are erecting a *flashing* light on Maneater or Menscheneter Island, in lat. $5^{\circ} 57' S.$, lon. $106^{\circ} 18' E.$, visible 16 m.

used by their ships; and with proper care it is safe. To proceed through it, a ship should pass between Menscheneter Island and the Great Cambuys, which can only be done with safety in daylight, on account of the shoals. Menscheneter Shoal is marked by a beacon. A *conical-top* beacon is placed on the W. extreme of Great Cambuys Reef, in 14 ft. water, bearing from the S. point of the Island about W.N.W., and from Menscheneter Island about N.E. by E. The depths are 9 and 10 fathoms in the passage (nearly 2 m. wide) between Menscheneter Shoal and the reef off Great Cambuys; and the best track, if no beacons are seen, is to borrow nearer to the former island than to the latter. When past Menscheneter Reef beacon, a direct course should be steered for Ontong Java Point; and when Little Cambuys bears N., you are 1 m. to S. of the Ander shoal, and may haul up about E., to pass to the S. of Middelburg Island. The coast, between Kaik Point and Ontong Java Point, forms a bight, safe to approach, the soundings decreasing regularly towards the Java shore; and nearly in mid-bight there is a place of some trade, called Songy Lampoon. From 9 to 10 fathoms are the common depths in passing through this part of the channel.

After passing between Middelburg and the beacon on Ontong Java Spit, the Dutch Channel goes to the W. of Schiedam; then between beacons to the W. of Onrust and Kuyper Islands, giving a proper berth to a reef which projects 1 or $1\frac{1}{4}$ cables from the N.W. side of Kuyper, and of which the limits are indicated by two beacons without crosses. The S.W. side of Kuyper Island may be approached without danger: but do not keep too much to the Java side, on account of a small *sunk* rock called Karang Kuyper, which bears S.S.W. $\frac{1}{4}$ m. from the island, with $2\frac{1}{2}$ fathoms on its shoalest part at L.W. A little way farther to the S.S.W., there is a sand-bank with one fathom water upon it. Soon after having rounded Kuyper, steer S.E. by E., towards Batavia Road, and the beacons of Reigersdaal and Rynland Shoals will be seen ahead; pass between them in 6 to $7\frac{1}{2}$ fathoms water, right toward the shipping in the road, and anchor in 6 or 5 fathoms mud, S. from Rynland beacon.

The **South Middle Channel** is very safe, with deeper water than the Inner Channel. To sail into Batavia Road by it, pass to the S. of Middelburg and Amsterdam, betwixt them and Ontong Java Reef; having passed the latter island, instead of hauling to the S. for the Inner Channel between the islands and the main, steer directly E. for Haarlem Islet, leaving Schiedam to the S. When Haarlem is approached within $\frac{1}{2}$ m., edge away to the S.E., betwixt it and Rotterdam, and betwixt the latter and Hoorn, keeping nearest to Hoorn, on account of the Obie Reef $\frac{1}{2}$ m. to the E. of Rotterdam, on which a beacon with a *round* top is placed. Having rounded the S.W. point of Hoorn Islands about $\frac{1}{2}$ m. off, steer to the S.E., until the dome of Batavia church is brought to bear S. $\frac{1}{4}$ E., or S. $\frac{1}{2}$ E., to give a good berth to Jalan or Wapen Rock, with 2 to 3 ft. thereon, which lies S. by W. from Hoorn Island nearly 2 m., and about $2\frac{1}{2}$ m. to N.W. by N. of Rynland beacon. The W. part of Hoorn should not be too closely approached in passing; a cross, No. 7, placed in 12 ft. water, marks the centre of a ledge of rocks near the W. part of that island. After passing Hoorn, and having brought the dome of the church to bear between S. $\frac{1}{4}$ E. and S., steer direct for it, between these bearings, until you anchor in the road; by keeping the dome of Batavia church S. $\frac{1}{4}$ E., it will lead mid-way between Rynland Shoal and the E. reefs. The soundings throughout this Channel, after passing Amsterdam Island, are generally 9, 10, and 11 fathoms, until the depths decrease regularly near the road.

The **EASTERN CHANNELS**, leading to Batavia Road, are very safe and convenient. Those between the islands of Edam, Alkmaar, Enkhuyzen, and Leyden, have soundings of 14, 12, 11, and 10 fathoms; the channel to the S. of Leyden is also safe, if attention be paid to the shoals which lie between it and the main; and to a small coral rock, carrying $1\frac{1}{2}$ fathoms, at $2\frac{1}{2}$ cables to E. of Leyden, upon which the Dutch ship *Amstel* struck. The best track to avoid this rock is not to approach Leyden Island nearer than a mile, and to keep Alkmaar outside or to the W. of Edam.

Vader Smit, a coral reef above water, with a beacon and a *round* top on its S. point, which bears S. $\frac{1}{4}$ E. from Leyden, and about N.W. $\frac{1}{4}$ N. from Priok Point, is the first shoal between Leyden and the Java shore. At 1 m. to E. of Vader Smit, and S.E. by S. from Leyden, there is another rock, with $2\frac{1}{2}$ fathoms at L.W., on which a *round* top beacon is erected; this rock is very dangerous to ships proceeding through this channel, and to avoid it she should pass $1\frac{1}{2}$ or 2 m. to the E. of Vader Smit. About a mile N.W. from Priok Point there are two other patches of coral rocks, in 3 and $3\frac{1}{2}$ fathoms water. The best channel is to the S. of Vader Smit, in $5\frac{1}{2}$ and 6 fathoms.

The coast of Java, to the E. of Priok Point, may be approached safely by the lead to 6 fathoms, as the soundings decrease regularly; though off Krawang Point (13 m. to N.E. of Priok Point), it is better not to borrow nearer than 8 fathoms, as the depths decrease there very quickly to 3 fathoms.

The **SHOALS** in **Batavia Road**. **Nierstuk** is a rocky shoal of about 2 cables in length, usually covered by breakers, having 2 ft. depth at L. W.; easily discovered by discoloration of the water, or by breakers which show with the least wind. A beacon is seen on its S. part, bearing W. by S. $\frac{1}{2}$ S. from Vadir Smit, and about S.S.W. from Leyden. The passage between it and Vadir Smit is more than a mile wide, with 6 fathoms depth. The passage between Nierstuk and the Shoals of Neptunus, and Pas-op, is more than $\frac{1}{4}$ m. wide, and 6 or 7 fathoms deep.

Neptunus Shoal consists of large rocks with 2 ft. water; it is marked by a beacon with a conical top on its W. extremity. **Pas-op Shoal** is very small, with 14 feet on its shoalest place, and 5 and 6 fathoms close to; it bears E. $\frac{1}{4}$ N. a full mile from Rynland Shoal, and carries a beacon with a conical top. There is a small coral rock, with $2\frac{1}{2}$ fathoms at L.W., and close around are 5, 6, and 7 fathoms; lying about S. by W. $\frac{1}{4}$ W. from the beacon of Pas-op, and nearly E. from the Rynland Shoal.

Rynland Shoal is very small, and has 15 ft. water on its shoalest part, shown by a beacon with a round top bearing N. by W. $\frac{1}{4}$ W., $1\frac{1}{2}$ m. distant from the extreme end of the pier of Batavia River. The channel between Rynland and Pas-op Shoals is a mile wide, and 6 to 8 $\frac{1}{2}$ fathoms in depth.

The **BAY** of **BATAVIA** is very capacious, extending from Ontang to Krawang Points about 7 leagues, and from the pier-head to Edam Island, or N. and S., about 3 leagues. The bottom consists of soft mud; but in the vicinity of the shoals, rock. The soundings are from 10 to 4 fathoms, regularly shoaling towards shore; and generally throughout the bay, at 1 m. from the beach, there will be found 3 fathoms. Except in a few places, the Road is shut up by a chain of islands, by which ships are always protected against a dangerous swell setting in. The Road may be considered as very safe, for although ships do roll considerably in the strength of the Westerly monsoon, and are consequently compelled to strike their top-gallant masts and yards, no danger is to be apprehended of driving, from the excellence of the holding-ground. The usual place for large ships to anchor is in 5 or 6 fathoms, on a mud bottom, about a mile distant from the pier-head, and between S.S.W. and S.E. from Rynland Beacon. They seldom moor, as the anchors generally bury themselves in the soft mud; for which reason it is advisable to sight the anchor sometimes during a long stay. Small vessels may anchor nearer to the pier-head, in 4 or $3\frac{1}{2}$ fathoms. In the N.W. monsoon there is sometimes such a heavy swell which breaks at the mouth of the river, that proas are unable to get out, and ships' boats may be exposed to great danger if sent on shore after a blue warning-flag is displayed at the boat-house. Most of the islands and shoals lying near the Road consist of coral with white sand above water, and are covered with various kinds of trees; they are steep-to, and it would seem that some of them increase in extent, so that it will be necessary to re-examine the depths from time to time: and prudence is therefore necessary when intending to pass over shoals, on which but just sufficient depth is indicated.

Aspect of Shore. The coast of Java hereabouts is generally flat, but 30 m. inland from Batavia the Gonong Gedeh, or the Blue Mountains, rise to a considerable height; Pangerango, 9,950 ft; Salak, 7,320 ditto; Karang, 6,000 ditto. In the W. monsoon their peaks may be seen from the Road in the morning, but are seldom visible during the E. monsoon.

Batavia Town is a place of considerable trade; but all foreign ships must obtain permission from the Shabbundar before they can trade with private merchants. The principal exports are sugar, coffee, spices, &c. The imports, opium, iron, and piece-goods of various kinds. At Batavia a ship may procure all kinds of necessary supplies; poultry, excellent fruits, and vegetables, are plentiful, and sold at moderate prices. The city is spacious, and many of the houses well built: but the low marshy coast around the bay, and stagnant water in canals (which intersect the streets) generate noxious vapours, rendering this place very unhealthy at all times to strangers. The most unhealthy time is when the canals have lost much of their waters, about the latter part of the dry season, from Sept. to Dec. Strangers ought never to sleep on shore, if it can be avoided. A few miles inland from Batavia, towards the hills, the country is healthy; and the Europeans who reside there differ much in appearance from those who inhabit the city, for the latter are in general sickly and emaciated.

Onrust is the great marine depôt, where ships are hove down by cranes erected upon wharfs, when they require repairs; and this small island, being the naval arsenal and dockyard, abounds with inhabitants. Vessels, wishing to rate their chronometers at Onrust, should know that the Flag-staff on the island is in $6^{\circ} 2' S.$, lon. $106^{\circ} 44' E.$

BATAVIA OBSERVATORY is in lat. $6^{\circ} 8' S.$, lon. $106^{\circ} 48' E.$ The Electric Telegraph is laid down between Singapore and Batavia.

The **Time Ball** is hoisted every day at five minutes before Noon (*Batavia mean time*) half-way up the pole; at two minutes to mean noon it is hoisted to the top, and precisely at Batavia mean

noon it falls. For those ships that wish to rate their chronometers according to Greenwich mean time, the moment of six o'clock A.M. Greenwich mean time is indicated in the same way: the ball being hoisted half-way up at 1h. 2m. P.M., Batavia mean time; at 1h. 5m., to the top; and exactly at 1h. 7m. 12.5 secs. P.M., Batavia time (which corresponds to six o'clock A.M. Greenwich time) it falls.

Light. On the W. pier at Batavia, is a *fixed* harbour light, 54 ft. above H. W., and visible 12 m. Vessels from the N. should bring the light to bear between S. $\frac{1}{4}$ E. and S. $\frac{1}{4}$ W., which leads to the anchorage; in coming from the W., and having passed Karang Kuyper, steer to the S.E., until the light bears S. Variation $0^{\circ} 45'$ E.

The Tides and the rise and fall of the water are not subject to fixed rules. In the S.E. monsoon it appeared to be H. W. there in the evening; and in the N.W. monsoon in the forenoon; the time of H.W. at F. and C. being generally 10 o'clock P.M. in the E. monsoon, and at 10 A.M. in the W. monsoon. The mean rise and fall was 2 ft., and the maximum and minimum 4 ft.

Climate. The mean height of mercury in the barometer is 29.67 inches. The influence of weather upon the barometer is very small; it being seldom raised by continued dry weather, or depressed by moist strong winds, more than from 1 to 3 lines above or below the mean. The mean temperature at Batavia in the morning and evening is from 70° to 74° , and at noon from 84° to 86° Fahrenheit, although it occasionally rises to 90° or 95° . The N.W. monsoon generally sets in at Batavia and along the Java coast about beginning of Nov., and the subsequent strong winds and heavy rains greatly cool the atmosphere. Batavia Road is rendered unhealthy by noxious vapours generated along the marshy coast and shoals at L.W., which are uncovered; and it seems to be chiefly in the shifting months of the monsoons that the Batavia fever is most frequent. Ships, therefore, intending to make a long stay should not anchor too near shore. There is at Batavia an excellent establishment for purifying the water for the shipping in the Road; this water is conveyed on board at fixed and moderate prices, in whole or half-leaguers, or in proas fitted with tanks.

MAKING THE LAND ABOUT JAVA HEAD.

Java Head, the W. extremity of Java, is in lat. $6^{\circ} 47'$ S. and lon. $105^{\circ} 11'$ E. of Greenwich, or $1^{\circ} 36' 45''$ W. of Batavia, by chronometric observations. It is a bluff promontory at the foot of the high land, and is discernible at a considerable distance in clear weather. From Java Head the coast runs in a direction of S. by E. $\frac{1}{4}$ E. for 5 m., to **Palembang Point**, which is not far from Cape Sangian Sira, the most S. point of this part of Java, and a conspicuous land-mark from a distance, the hills within $1\frac{1}{2}$ m. of the Cape being more than 1000 ft. high. From **Cape Sangian Sira**, which lies in lat. $6^{\circ} 52'$ S., lon. $105^{\circ} 13'$ E., and at about 2 m. to the S., several rocks project, some of which are above water, and consequently easily discovered. The water is very deep close to these rocks; and along the shore, as far as Java Head, there is in most parts no bottom with 100 fathoms; but the breakers which line the whole coast seem to indicate that there are rocks under water, on account of which it is not advisable for a ship to run close in-shore, but to give a berth of at least 2 m. From Cape Sangian Sira the soundings decrease in the direction of Klapper Island to 40 and 20 fathoms, while between this island and Trowers Island, situated more to the E., they decrease from 20 to 12 fathoms. **Cape Sodon** is 6 leagues due E. from Sangian Sira.

Klapper Island, or Pulo Deli, formerly called Claps Island, and Breakers Island, is very low, covered with large trees, and along the beach only there are cocoa-nut trees. It lies 8 m. off Cape Sodon, the nearest shore of Java, and about 6 leagues E.S.E. from Cape Sangian Sara. It is surrounded by a reef, which in many places stretches off more than a mile, particularly off the W. end nearly 2 m.; but on the N.W. side there is a good watering-place, where the boats can enter a little river, through a channel, with reefs on both sides; and the ships may anchor in 18 to 24 fathoms, clay bottom, 2 m. distant from the island, close to those reefs, which partially dry at L.W. According to Captain F. H. Ampt, of the Dutch Royal Navy, this is a good watering-place in the Easterly monsoon. The depths are from 30 to 40 fathoms to the S. of Klapper Island, 4 m. off shore.

Trowers Island, or Pulo Tinjil, is nearly of the same circumference and outward appearance as Klapper Island, and lies E. by N. 12 m. distant from it. This island is also surrounded by a reef. On the N. and W. sides of this island there are from 13 to 19 fathoms water, and at the S.E. and S. sides, at some distance, no bottom with 50 and 100 fathoms line. Captain Klein, who lost the *Cheriton* here in 1847, reports that at $1\frac{1}{2}$ m. to the N. of the island, there is a **rock**, on which the native proas have sometimes struck. Everywhere else round the island from 13 to 19 fathoms will be found, and at a short distance to the S. more than 100 fathoms.

Along the coast to the N. of these islands, as far as Cape Sangian Sira, there are rocks which in some places lie $1\frac{1}{2}$ and 2 m. off; and it affords no shelter whatever with S.W. and S.E. gales. Lieut. Escher, D.R.N., discovered a shoal in 1837, at $1\frac{1}{2}$ m. from the shore, and just to the E. of Cape Sodon; it bears N. $\frac{1}{2}$ E. from the E. point of Klapper Island, and about W.N.W. from the W. point of Trowers Island, with $2\frac{1}{2}$ fathoms on it.

When making Java Head with hazy weather, the appearance of the land to the E. of Cape Sangian Sira, between it and the high land of Cape Sodon, bears much resemblance to the high land of the W. point of Java, with the adjacent hills on Princes Island; for the low land in such circumstances is not distinguishable at a distance, and is therefore often mistaken for the entrance of the Princes Channel.

Wynkoops Bay, formerly called Wine Cooper's Bay, is entirely open to W. and S.W. winds. Cape Anjol, its prominent S. point, in lat. $7^{\circ} 25' S.$, lon. $106^{\circ} 25' E.$, is low but easily distinguished, and conspicuous from the W. The entrance of the Bay is 3 leagues broad, and the whole length of the bay is 10 m. At the N.E. side of the bay are the government store-houses for coffee and salt. There are many spots of good anchorage ground, but a large funnel-shaped space in mid-channel, leading from the entrance to the store, is more than 100 fathoms deep. At 2 cables due W. from the stores, there are some sunken rocks, with 3 and $1\frac{1}{2}$ fathoms water. The best roadstead is to the S. of the store-houses, and is called the Palabouan Radja. Regular soundings will be found there and along the coast as far as Gambang Point, with good holding-ground of clay and sand; and vessels may safely anchor there in as far as 8 fathoms, or from $\frac{1}{2}$ m. to a mile off shore. In neap tides, the rise and fall near the store-houses is 2 ft. 7 in., and in the springs about $5\frac{1}{2}$ ft. At F. and C. the time of H. W. is 5 o'clock, but the time, as well as the rise, depends much upon the influence of the rivers, which often disturb its regularity. From Wynkoops Bay the coast of Java stretches 9 m. W. to Gebang Point, and from thence it trends more N.W. The coast is high and rocky, but becomes more level to the W. at Hussa Point, in lat. $6^{\circ} 51' S.$, and lon. $105^{\circ} 53' E.$, where there is a sandy beach: the whole coast is covered with trees. In the whole of that interval there is but little anchoring-ground, and in many places (very near shore) no bottom, with 100 fathoms line. A little to the E. of Hussa Point, lies a bank of soundings of from 15 to 30 fathoms water, coarse sand and mud, and extending to Trowers Island.

Ships coming from Europe in the Easterly monsoon generally shape their course so as to make the land to *windward* of Sunda Strait, and it often happens that they get first sight of the land near Cape Anjol, or of Wynkoops Bay. Should a vessel in such a case require fresh water, it may speedily be procured in Wynkoops Bay, whilst beef, rice, and fowls may also be had there. This bay is also very convenient for shipping produce for Europe.

Further Remarks about Sunda Strait will be found in the next Chapter.

ISLAND OUTSIDE OF SUNDA STRAIT.

CHRISTMAS ISLAND, though remarkably placed about 80 leagues to S. of Sunda Strait, seems not to have its position properly determined. It is about 3 leagues in length each way, of square form; may be seen 12 leagues off in clear weather; and abounds with trees, many of which are said to be cocoa-nut and limes. Captain G. Richardson, in the *Pigot*, endeavoured to find anchorage at this island; two boats were sent to examine it, but they could find no place where a ship might anchor, during a search of two days, sounding round the island; it was found steep-to, with 95 fathoms within a cable's length of shore; and the only accessible part they discovered was at the N.W. part of the island, at a small white beach, resembling sand, but formed of white stones and coral, where they landed, and got a number of land-crabs and boobies. Some wild hogs were seen, but they could find no runs of water.

The N. end is said to be in lat. $10^{\circ} 27' S.$, and the body of the Island in lat. $10^{\circ} 31' S.$, lon. $105^{\circ} 33' E.$; or 19 m. E. from Java Head by chronometer to the W. end of the Island, which makes that W. Point in lon. $105^{\circ} 30' E.$

CHAPTER XX.

PASSAGES IN THE INDIAN OCEAN.

WIND AND CURRENT CHARTS—EXPLANATION—ATLANTIC OCEAN WINDS—INDIAN OCEAN WINDS—TRADES AND ANTI-TRADES—MONSOONS—OCEAN CURRENTS—PASSAGES FROM GOOD HOPE CAP TO RED SEA—PERSIAN GULF—BOMBAY—CEYLON—BENGAL—BURMAH—SUNDA STRAIT—STEAMER TRACKS—HOMEWARD PASSAGES.

(VARIATION OF COMPASS OFF THE CAPE 32° W.; AT ST. PAUL'S, 21° W.; AT KING GEORGE SOUND, 5° W. OFF MADAGASCAR S. POINT, 19° W.; AT MAURITIUS, 10° W.; AMONGST THE SEYHELLES, 5° W. AT SOCOTRA, 2° W.; THE SAME AT THE CHAGOS, AND AT N.W. CAPE OF AUSTRALIA).

An account of the Passages throughout the Indian Ocean may conveniently be prefaced by some description of the Winds and Currents according to the seasons.

The Admiralty Wind and Current Charts* for the Indian Ocean furnish an excellent basis for the development of ships' tracks during four distinct periods of the year. We have taken advantage of the opportune appearance of this valuable publication; and our Passage Charts are founded upon it. We therefore give the following explanation of the signs and symbols adopted.

WINDS and their Symbols. Winds are grouped in 5 degree squares.† Their prevalent directions (true) are shown by arrows as they fly. The *relative* durations of the several winds in a group, are denoted by the lengths of the arrows; when recorded as having blown from *opposite* points, one half the arrow's length can alone be shown.

Calms. Calms are indicated by shaded circles, the relative amount for each square being denoted by their varying sizes; thus, if in a thousand observations of 8 hour's duration, embracing winds and calms, five hundred were calms, the circle would be that inscribed between two meridians 5° apart; if one hundred were calms, the diameter of the calm circle would be one-fifth of the fore-going, or equal to one degree of longitude.

Trade Winds. The regions over which these winds prevail, are distinguished by colour, N.E. *blue*—S.E., *red*. Their average limits are marked in *similarly* coloured lines; and, when necessary, the equatorial limits are further distinguished by one, two, or three lines for the consecutive months.

North. The average boundary of the S.W. winds, which prevail on the W. coast of Africa, is marked by a plain line, the region over which the winds prevail being distinguished by *purple* colour.

Monsoons. In the Indian Ocean and China Sea, the region and *average* limits of the N.E. monsoon, are distinguished in the same manner as the N.E. trade wind. The limits of the Westerly or N.W. monsoons, (that prevail in the Indian and Western Pacific Oceans) are shown by broken lines, with the distinguishing number, when necessary, for the consecutive months. The regions of the S.W. monsoon, are coloured *purple*; the regions of the N.W. monsoon, or middle monsoon, have a faint shade of *black*.

* Compiled by Staff-Captain F. J. Evans, R.N., F.R.S., and Staff-Commander T. A. Hull, R.N., Hydrographic Department, and published in October, 1872.

† It is necessary to apprise the Navigator that at the present time materials for constructing Wind Charts are very unequally distributed. In the squares of frequented tracks of navigation, the Wind arrows may be drawn from a result of several thousand observations, whilst those in unfrequented tracks may be drawn from only a few hundred observations, or even a less number. Some wind arrows and calm circles are given at stations on land: they are drawn on the same principle as those in the Ocean squares.

Rains (according to the seasons on Coasts.) Those experienced in the tropical regions are occasionally noted in their respective localities.

Hurricanes—Cyclones—Typhoons. Tracks illustrating the course of the centres of numerous well authenticated storms (known under the above names) in the Indian and China Seas, are shown by thick black lines in the regions in which they prevail. These storms are *progressive* revolving gales of unusual violence; they may be generally described as great whirlwinds turning round and rolling forward at the same time. The *average* rate of the progressive movement of the centre or focus of the West Indian hurricanes is about 300 miles a day; those on the Malabar Coast, Bay of Bengal and China Sea about 200 miles a day, and often less, whilst the cyclones of the Austral Indian Ocean vary in their rate of progress from 200 to 50 miles in the twenty-four hours. The direction of the progress of the central track, is shown by feathered arrows.

Within the tropics, the effects of these storms are often felt 100 m. on either side of the central track, this limit expanding in the extra-tropical regions.

The seasons in which these storms prevail are as follows:

Cyclones —Malabar Coast and Bay of Bengal	April, May, Oct., Nov.
South Indian Ocean	Dec. to April.
Typhoons —China Sea	July to Nov.
Coasts of Japan	Aug., Sept., Oct.

Ice. The general limits* of the icebergs, which (from the experience of modern navigators), are found to fringe the Antarctic Seas, are shown by a boundary line. This boundary, must, however, only be considered an *arbitrary* one, as, in different years, isolated bergs may be fallen in with to the North of it, especially when near the projecting capes of the several continents.

In the high Southern routes, adopted of late years by navigators in the voyages to and from Australia and New Zealand, the greatest number of icebergs have been seen in the Austral Summer season, or in Nov., Dec., and Jan., and the smallest number in June and July. It has also been observed that more icebergs are seen in March and April than during Sept. and Oct.

Temperature of air and sea. The indications of the Thermometer should not be neglected in these Seas, as there is generally a diminution of temperature of the air and sea on approaching ice; this, however, must not be assumed as an infallible guide. Icebergs should, if possible, be passed to *windward*, to avoid the loose ice floating to leeward.

CURRENTS AND THEIR SYMBOLS.

The Currents of the Ocean are properly distinguished by the different and significant names *Stream* and *Drift*. The *Drift Current* is merely the effect of the wind on the surface of the water; as for example, in the region of the trade winds, where the whole surface of the sea, generally speaking, is converted into a slow current moving to leeward. A Drift current is therefore shallow and slow, and can run in no other direction than to leeward.

The Stream Current has been described as an accumulation of the parts of the drift into a collective mass, by the intervention of some obstacle; the mass then running off by means of its own gravity, and, taking the direction *imposed on it* by the obstacle, becomes a Stream of Current, and, in many cases, a powerful Stream pursuing its way like a vast river through the Ocean.

Stream Currents would appear to be further dependent on the inequality of the amount of heat received by the earth from the sun, in the tropical and polar regions. Experience proves that warm water flows in an *upper* current from low to high latitudes; cold water in an *under* current from high to low latitudes, and thus the diurnal rotation of the earth, as well as the configuration of the sea coast and ocean bed, affects their direction. These "*Oceanic Rivers*" may vary in breadth, like the Gulf Stream (from 50 to 250 m.) and are sufficiently deep to be turned aside by banks which do not rise within 60 or 80 fathoms of the surface; as the Agulhas current is deflected by the Agulhas bank off the Cape of Good Hope. They run with such rapidity (sometimes 100 m. a day) as to be uninfluenced materially by antagonistic winds, except near their borders.

Changes of temperature of the surface water are frequently abrupt, and these changes are especially marked on the edges of the Stream Currents; as for example, on the N. and W. edges of the Gulf Stream, when it is met by the Arctic Current from Davis Strait, and the two run nearly side by side. Also off the Cape of Good Hope, at the junction of the Agulhas Current and the

A more detailed account (in the graphic form) of Icebergs, which have been fallen in with in the Austral Indian Ocean, is given on the Chart at page 80, reduced from another excellent Admiralty Chart, which shows (without that *distortion* unavoidable on Mercator's projection) the water-spaces of those seas. We have added a few tracks for ships.

cold water flowing into low latitudes from the Antarctic Sea. And again off the E. coast of South America to the S. of Rio de la Plata.

It is especially to be observed, that the seaman must be prepared for unsettled weather and a cross and often turbulent sea, when passing through alternating bands of warm and cold water.

Submarine Currents (indeed the "wonders of the deep," which science is now intent upon throwing light upon) are, in our judgment, nature's effort to preserve the equilibrium which has been meddled with by the action of winds on the surface water. In Gibraltar and Babelmandel Straits, *submarine* currents must at times exist.

WINDS OF THE ATLANTIC OCEAN.

Variable winds prevail in both hemispheres beyond the limits of the Trade winds. In the North Atlantic Ocean, when the sun is in the N. hemisphere, the prevailing westerly winds are S.W. and W.S.W.; if, on the contrary, the sun is in the S. hemisphere, they are more from W.N.W. and N.W. This last period is that of gales and bad weather between North America and Europe. In the English channel, Easterly winds prevail in Feb., March, April, and part of May; during the other months of the year Westerly winds predominate.

In the South Atlantic Ocean, the Westerly winds vary from N.W. to S.W., but are changeable and irregular. In the zone between the parallels of 28° and 35° S., the winds which are most frequently met with are from N.E. to N.W. by N., and from N.W. to S.W. by W., principally during June, July, and Aug.

The polar limit of the N.E. Trade wind in the Atlantic ocean generally extends to the parallel of lat. 27° N., while that of the S.E. Trade lies in a line between the Cape of Good Hope and the Islands of Trinidad and Martin Vaz. This limitation varies about *three degrees* N. or S. with the position of the sun. The equatorial limits of these Trade winds generally vary in the same manner: that of the N.E. Trade travelling from 12° N. in Aug., to lat. 2° N. in Feb., on the meridian of 26° W.; while that of the S.E. Trade changes from lat. 3° N. to 1° N. during the same months and in the same longitude. When the sun is in the N. hemisphere, and at its greatest distance from the Equator, the N.E. Trade wind inclines more from the East.

During summer the N.E. Trade is sometimes gained before reaching the latitude of Madeira; this fact is, however, only an exception. Between the months of Nov. and March the *variable* winds of the temperate zone extend to lat. 20° N.

The N.E. Trade wind varies considerably under the influence of the land, and to the Eastward of lon. 25° W., within 400 or 500 m. of the coast of Africa, it blows more from the Northward than it does in the open ocean. Between the Canary and Cape Verde Islands during the Northern summer months, it blows from N.N.E. to N.E. for 55 days out of every 100; and during the winter months, from Jan. to March, the wind in the neighbourhood of Cape Verde draws to the N.W. and West.

It will be seen that the most favourable time for crossing the line will be from Dec. to June, when the passage will be less interrupted by calms, squalls, and variable winds. In the N. hemisphere, the N.E. Trade wind verges, according to the season, more or less towards the Equator; but it seldom passes to the S. of it. On the contrary, the S.E. Trade wind sometimes extends as far as lat. 5° N. in the neighbourhood of the coast of America.

Sometimes the N.E. and S.E. trade winds join each other, generally somewhere about the meridian of 28° or 33° W., where a ship may pass in a squall from one trade to the other. Near the Equator, the winds generally draw more from E. to S. than from E. to N.

NOTES on the use of BAROMETER. The average range of the barometer in the higher latitudes (60° — 50°) is about 1.5 in.; but, on extraordinary occasions, ranges of 2.75 and 3 inches have been recorded.

In the intertropical regions the range varies from 0.4 to 0.2 in., and in the neighbourhood of the Equator it seldom exceeds 0.15 in., this small change being due in great part to a regular diurnal variation. The average movement of the barometer within the tropics being thus confined within small limits, any interruption of the law may be deemed a *warning* of the approach of bad weather.

The fall of the barometer in hurricanes ranges from 1.0 to 2.0 and even 2.5 in.; the rapidity of the fall (and the depression of the mercury) increases as the centre of the storm approaches.

In the N. hemisphere, the effect of the veering of wind on the barometer is according to the following law:—

With East, or S.E., and South winds, the barometer *falls*.

„ S.W. winds, the barometer ceases to fall and begins to rise.

With West, or N.W., and North winds, the barometer *rises*.

„ N.E. winds, the barometer ceases to rise and begins to fall.

While in the S. hemisphere the effect is as follows :—

With East, or N.E., and North winds, the barometer *falls*.

„ N.W. winds, the barometer ceases to fall and begins to rise.

„ West, or S.W., and South winds, the barometer *rises*.

„ S.E. winds, the barometer ceases to rise and begins to fall.

WINDS and WEATHER off the CAPE. From Sept. to May (the Cape or Austral summer) the prevailing winds are from S.E. These sometimes rise to gales at this season, and last for three days together, sometimes much more, being followed by calms and light W. winds. Eastward of Cape Agulhas they blow steadily from S.E. by E., but to the Westward they follow the trend of the land, and in False Bay blow at about S.S.E.

In strength the S.-Easters are singularly local at times, the wind being light; for instance, at Cape Hangklip, when ships were driving in a gale from the same quarter in Table Bay; and on another occasion there was a furious gale in Simons Bay, when the *Hydra*, at anchor under Point Danger, had scarcely any wind.

Although Sept. to May is the season of S.-Easters, Westerly winds and violent gales occur sometimes throughout the year, and are not unfrequent in Sept., Oct., and April; but the best chance of avoiding them is to keep well in with the land.

From May to Sept. (the Cape winter) Westerly winds prevail, with occasional breezes of short duration from the S.E. During this season W. gales are frequent, and are most severe in the months of June, July, and August. These gales generally begin at W., and back to N.W., or as far as North, varying again to the W., and eventually blowing up fine at S.W. If, when running along with an Easterly wind, it should shift to N.E., be prepared for bad weather, particularly if there be lightning in the N.E. or N.W.; but, although the glass falls, bad weather may not come immediately, as the barometer always stands lower with Northerly winds in S. latitudes. If, however, the glass falls, and heavy dark clouds gather in the W., prepare quickly for bad weather, notwithstanding the wind may be Easterly and the sky clear overhead: under these circumstances ships have frequently barely time to take in all light sails, and close reef the topsails, before they are taken aback from the N.W., and a heavy gale commences. This occurred to the *Brisk*, and to many other ships, particularly in the longitude of Algoa Bay, and was the supposed cause of the foundering of H.M.S. *Nerbudda*, with all hands, in 1856.

Ships proceeding to the Westward between May and Sept. should be well found, and able to encounter a succession of gales. The best plan is to endeavour to keep in the strength of the Agulhas current, carrying low sail; but from Sept. to May it is better to keep more inshore, where there is less likelihood of encountering a Westerly gale. The sea is always smoother when well in on the bank.

Ships proceeding to the Eastward between May and Sept. are generally obliged to go Southward to lat. 39° or 40° S., in order to get Westerly winds and a favourable current; but between May and Sept., when Westerly winds prevail, if bound to any of the S.E. African ports, they can frequently coast along inside the current, at least as far as Cape St. Francis, but there the current must be encountered.

Ice Islands, commonly called **Icebergs**, are very rarely fallen in with off the Cape of Good Hope to the northward of lat. 40° S. Nevertheless, there are instances of ice islands being seen off the Cape; it is therefore desirable to keep a good look out for them. (See pages 79 and 80).

WINDS AND CURRENTS OF THE INDIAN OCEAN.

The S.E. Trade Wind in the Indian Ocean is found between the parallels of 10° and 28° S., from the W. coast of Australia to within a few degrees of Madagascar. Its N. limit varies with the season, changing 5 or even 10 degrees to the N. or S., according as the sun has N. or S. declination. When the sun is in the N. hemisphere, and at its greatest distance from the Equator, the wind veers more to the S., varying from S.E. to S.S.E.; and when in the S. hemisphere, it takes a more Easterly direction, varying from E.S.E. to East, and sometimes to E.N.E. To the S. of this trade, as in the Atlantic, the prevailing wind, or *anti-trade*, is from N.W.; this is met with during greater part of the year.

Monsoons. In other parts of the Indian Ocean, and in adjoining seas (owing to the interference of large masses of land), the year is divided into two seasons or *monsoons*. The winds to the N. of the Equator blow S.W. from mid-April to mid-Sept., and N.E. from Nov. to mid-March. Their limits are from the Equator to the Mekran Coast and Calcutta, and in the China Sea to lat 29° N.,

and from the E. coast of Africa to the coasts of India, China, and the Philippine Islands. Their influence is often found in the Pacific Ocean as far as lon. 145° E., and to the N. as far as the Japan Islands. In the middle of the Bay of Bengal, and near its E. coast, towards Malacca Strait, calms are frequent, especially in Feb., March, and April; when, in the two last months, S. winds blow upon the delta of the Ganges; and N.W. winds upon Arracan coast. In the N. part of the bay the regularity of the monsoons is thus lost, and the winds are unsteady.

The monsoons to the S. of the Equator blow S.E. from mid-April to mid-Sept.; and N.W. varying to W.S.W. from mid-Oct. to mid-March. Their limits are from the Equator to the parallels of 10° or 11° S. in the Indian Ocean, and to 12° and 14° S. in the W. part of the Pacific, and from near the coast of Africa towards the E. and beyond New Guinea. The N.W. monsoon is subject to many irregularities, and rarely blows either strong or regular, except in Dec. and Jan., at which time it occupies the space from Seychelles to Sumatra, comprised between lat. 10° or 12° S., and 2° or 3° N. The S.E. monsoon, which is the period of the fine season S. of the Equator, may be considered an extension of the S.E. trade, which blows as far as the Equator, when the sun is near the N. tropic (Cancer), and recedes to lat. 10° or 11° S., when the sun is near the S. tropic (Capricorn).

The S.W. monsoon is the fair season in the Mozambique Channel, and begins in April and continues till Nov. The winds vary during this monsoon from S.W. to S.E., and E.S.E., particularly near the S. end of Madagascar; close to the African coast land breezes are frequent. Squalls from W. to N.N.W. sometimes happen during the S.W. monsoon, but never continue long. In mid-channel the monsoon is more steady, and generally blows right through; there are, however, exceptions to this, for in the S. part of the channel light variable winds and W. currents have sometimes retarded vessels bound to India through this channel.

The N.E. monsoon commences in Nov. and prevails until March. In the N. part of the channel it begins early in Nov., but towards St. Augustine Bay not till end of the month, and seldom extends farther S.; the prevailing winds varying from S.E. to S.W., during both monsoons, between Cape Corrientes and the S.W. part of Madagascar. It is chiefly during the N.E. monsoon that storms occur, when S.E. and S.W. winds, which prevail without, are blowing strong. These winds blow into the channel and are resisted by N.E. and N.W. winds, which produce a high turbulent sea, and sometimes *whirlwinds*, by their opposing force; the sky is then overclouded, and the rain heavy. The *tornadoes* of the N. part reach Mozambique, and sometimes these violent storms reach as far N. as Zanzibar.

E. Coast of Madagascar. The S.E. trade does not extend as far as the Madagascar coast. On the E. coast of this island, as in Mozambique channel, monsoons are regularly established. The N.E. monsoon, varying to N.N.E., blows from Nov. to March, and the S.E. monsoon from April to Oct. However, in the S.E. part of Madagascar, N.E. winds are generally found, which, veering round the coast, blow as far as Cape St. Mary. To the W. of this Cape, and off the S.W. end of Madagascar, they blow from S.E. to South during the whole year, but do not reach far to the N. along the W. coast of the island. Land winds are not known on the E. coast of Madagascar, and those above mentioned are sea-breezes (day winds) that blow on the coast; commencing about 8 or 9 a.m., they freshen up towards noon, when they blow strong; and, continuing so till 3 p.m., they gradually abate towards sunset.

At Seychelles and Chagos Islands. From the Equator to lat. 12° S., in which belt these islands lie, the S.E. monsoon prevails from May till mid-Oct., which is their fine season, and the climate is said to be delightful. The N.W. monsoon, the rainy season, during which the winds vary between N.W. and W.S.W., is from mid-Nov. or beginning of Dec. to the beginning or end of April. In Dec. and Jan. the weather is very sultry, and the rains fall with greatest violence.

The Mauritius hurricanes do not extend to Seychelles, their equatorial limit being lat. 10° S.; yet the *Seringapatam* is said to have had a rotatory storm in the end of Sept., 1851, about 200 m. to S.E. of Mahé. Being thus favourably situated, these islands are sometimes resorted to by English and French men-of-war to spend the hurricane months at.

At the Chagos archipelago the winds are much the same; the N.W. monsoon or rainy season is from mid-Dec. to mid-April. In the latter month and part of May the winds are variable. From June to Sept. the Easterly monsoon (which is in reality only the S.E. trade blowing up towards the Equator) prevails, the wind occasionally veering to E.N.E., but mostly at E.S.E. In Nov. and part of Dec. the winds are again variable, and much from N.W.

Maldivh Archipelago. As the Maldivhs occupy a space of nearly 8° degrees of latitude, and are partly S. of the Equator, it may be expected that their climate will be influenced on the one hand by the N.W. monsoon of the Chagos and Seychelles, and the S.E. trade when it blows up to the line: on the other hand by those atmospheric disturbances which usher in the N.E. monsoon

of Hindostan and Ceylon. Therefore it is deemed necessary to give a separate description of the winds that are experienced at both N. and S. extremes of this long chain of islands.

Southern Maldivhs. Ad-du Atoll, being 40 m. to the S. of the Equator, is almost *without* the influence of the regular Indian monsoons; the winds and weather being very variable, subject to squalls and rain. The N.E. monsoon is felt in Jan., Feb., and March; the winds generally from North and N.E., but occasionally from W. of North, and the weather is less cloudy and rainy than when the S.W. monsoon prevails N. of the line. In April and May the winds are variable, but mostly from the Westward. From May to Dec. the winds are from W. by S., to S. and S.S.E., with much rain and squalls. About the middle of the latter month, which is about the time that the S.E. trade finally retires Southward, and the N.W. monsoon commences below the Equator, hard squalls and fresh gales from W. to W.N.W. with heavy showers of rain, occur at the Equatorial channel, lasting for a fortnight about.

Mali Atoll. This central part of the Maldivhs marks a great difference in the weather during the N.E. monsoon, for the Southern groups then experience frequent squalls and rain with variable winds; whereas to N. of Mali, *that* is the season (as at the Lakadivhs) of fine weather and generally moderate breezes. There is no such marked difference in the S.W. monsoon.

Northern Maldivhs. At Hea-wandu Pholo Atoll, the head of the Maldivhs, the N.E. monsoon is steady from mid-Dec. to the end of Feb., between N.N.E. and E.N.E., moderate and light breezes, with slight showers of rain about every fortnight. In March and April the winds incline more from N. and N.W.,* until in May the S.W. monsoon commences, and lasts four months only. In Sept. the winds become N.W., but occasionally W. squalls accompanied by rain. In Oct., the winds are moderate and variable from W. by S. to N. by W., when the weather is cold and pleasant, but occasional hard squalls occur with heavy showers of rain at about the same period as the Bombay *siro-phanta*. In Nov. the winds are light between N.N.E. and N.N.W., with occasional Easterly squalls; after the middle of the month there occurs a period (about one week) of dark cloudy tempestuous weather, with long continued rain from the W.; this seems to be at the same time as the change of monsoon in the Gulf of Manar; after which the N.E. monsoon is fairly established, and throughout Dec. is steady at E.N.E., with pleasant and clear weather, but occasional squalls and rain from about E.S.E.

Lakadivh Islands. The winds and weather in the vicinity of Minikoi island are much the same as experienced at the head of the Maldivh group, and at the same time differing little from those amongst the N. islands and reefs of the Lakadivhs, amongst which the E. I. C. surveying brig *Taptee* spent one entire fine season from Nov. to April.

At the commencement of the year the N.E. monsoon is at its height; but, though steady, very light indeed, seldom attaining to a moderate breeze, unless the wind hauls to the N. point or a little W. of it, when a fresh breeze may occur for two or three days. Towards the end of Feb. there remains very little Easting in the wind. In March, it is usually N. throughout the day, and N.W. between sunset and sunrise; being strongest about midnight, a fresh breeze.

In the beginning of April, lightning begins to exhibit at night, and in a few days sharp squalls with rain occur in the evening (or early night) from the S.E. quarter, and sometimes from the W.: strong N.W. winds succeeding them for three or four days; therefore April must be considered an unsettled month when a Southerly gale, sometimes a *cyclone*, is likely to happen along the Malabar coast (*see* page 301). The *Cleopatra's* cyclone (of mid-April, 1847) was felt among these islands, commencing at N.E., round by North to N.W., the vortex of the gale passing between them and the coast, but very close to the E.-most islands of the Lakadivh group, over which the storm wave committed much havoc; throwing up masses of coral of a ton weight, along the weather shore, and destroying 1800 people. In May the winds are mostly N.W.; but occasional S.W. breezes and a W. swell herald the S.W. monsoon, which is fairly established before the end of May and lasts till Sept. when the wind hauls to the N.W., and during that month and Oct. hangs between N.W. and N. by W., and in Nov. between N.N.W. and N.N.E. In this latter month Southerly gales have been experienced at Bombay and along the Canara coast (*see* page 302), and N.E. and S.E. gales to N.W. of the Lakadivhs. These atmospheric disturbances occur about the same period as the tempestuous weather at the head of the Maldivhs, or a little later than the burst of the Madras monsoon (sometimes ushered in by a *cyclone* gale). For the first half of Dec. the wind hangs much at the N. point, sometimes getting to N.N.W., and blowing fresh for two or three days; in the latter half it gets more Easting and may be fairly called the N.E. monsoon, but it is of little strength, seldom attaining to more than a royal breeze.

* In April gales and squalls may be expected from *uncertain* directions, as they frequently come from cyclones not far off. (*See* page 301).

CURRENTS OF INDIAN OCEAN, ARABIAN SEA, AND BAY OF BENGAL.

The surface drift, which affects a vessel's passage, is all we are yet acquainted with, and will be described in these Sailing Directions, according to the seasons of the year. At the summer and winter solstices the currents are very different, and yet most books on physical geography (of which no two agree) group them together as if there were no periodical changes.

The Agulhas Current appears to be formed of two converging streams, the greater one flowing W.-ward from the trade wind latitudes, and the other following the coast to S. from the W. part of Mozambique Channel. These streams join about Natal, and form the powerful Agulhas current, which, flowing at first near the shore, begins to branch off at Hood point, and thence nearly follows the course of the edge of Agulhas bank, but passes over the S. extreme of it. In lon. 20° E. it divides into two weak branches, one flowing N.W. about one knot per hour past the Cape peninsula into the Atlantic, and the other mingling with the counter current.

The Agulhas current is seldom much felt on the bank, and near the land there is frequently an Easterly set, particularly between Capes Hangklip and Agulhas, where, on two occasions, H. M. S. *Hydra* found an E.S.E. current of one knot. The temperature of the water generally indicates whether you are in the Agulhas current or not, as it is considerably warmer than the sea both N. and S. of it. The strength of the current is greatest off Cape Recife, where it sometimes attains a velocity of 4 knots, and frequently 3 knots, but its average rate between Hood Point and lon. 24° E. is $2\frac{1}{2}$ knots, becoming weaker as it proceeds to the W. from thence. At times the velocity of the current is said to be checked by Westerly gales, and to run all the stronger afterwards; but this is not usually the case; it more often runs in the very teeth of the gale, causing a dangerous steep sea. Instead of being checked by gales the current is more likely deflected from its ordinary course. The breadth of the Agulhas current is not great, probably from 30 to 50 m., but this varies very much, and reliable information on this point is difficult to obtain. In calm weather we have observed the sea much confused, with overfalls, when about 45 m. from shore in lon. 25° E.; this was at the time the inner edge of the current.

The Counter Agulhas Current (running to the Eastward) is chiefly found between latitudes 37° and 42° S., but frequently not to the N. of lat. 38° S.: when in the longitude of Agulhas it has a mean velocity of $1\frac{1}{2}$ knots, and it is much more extensive than the Agulhas current. The strength of this counter current is very variable: on one occasion, when proceeding Eastward, H.M.S. *Brisk*, in lat. 39° S., had a 3-knot current in her favour (70 m. in the 24 hours), the wind being fair also, but a heavy sea running to the Westward caused the ship to pitch so heavily as to necessitate running under close reefed topsails, although the wind was moderate.

The Trade Drift is a Westerly surface movement extending sometimes nearly to the Equator, (but at the period of the Austral summer, not much more than the same space in latitude as Madagascar,) and extending from near Australia to Madagascar, round the N. end of which it runs Westward with great velocity towards the Comoro Islands. There during one-third of the year it unites with the Indian N.E. monsoon current, and flows down the Mozambique channel, to the S. of which it is joined by, or runs parallel with that stream which passes S. of Mauritius and Madagascar. We are indebted to H. M. cruisers and those of the Indian Navy (employed formerly in the quasi suppression of the slave trade), for further light upon oceanic movements in this direction. To the N. of the Comoro Islands, a N.W. current of 1 or $1\frac{1}{2}$ knots per hour is generally found. This effectually cuts in two the so-called Mozambique current, which Maury described as "another Gulf-Stream," running with constancy to the South.

Constant Westerly Streams are found off the N. and S. extremities of Madagascar; that great island stands athwart the course of the superficial Trade-drift, dividing its waters, but accumulating them into deep and rapid stream-currents off Cape Ambre and Fort Dauphin.

The Westerly Stream that flows past Cape Ambre strikes the African coast about Cape Delgado, and there bifurcates. One branch flowing N., past Zanzibar, and on to Socotra with the Southerly monsoon; but during the N.E. monsoon (Dec. to March) it is deflected from the land towards the E., below the Equator, or between lat. 2° and 3° S., (from which position we shall trace it again presently). The other branch flows Southward (with constancy only during the N.E. monsoon) past Mozambique, following the African coast and past Cape Corrientes; below (sometimes off) this cape it is joined by that branch of current which flows past the S. end of Madagascar towards Cape Agulhas, and which for distinction we call the Dauphin-Agulhas Stream, usually spoken of as the *Agulhas Current* when it arrives off that Cape.

The current which we have now traced from Cape Ambre past the Comoro Islands and Mozambique (constant and strong there only during the prevalence of the N.E. monsoon) is doubt-

less *that* spoken of generally as the Mozambique current, but its origin is in the Trade-Drift, not a particle of it comes from the Arabian Sea, as Maury supposed.

Commodore de Horsey, R.N., the able compiler of "*The African Pilot*," says of the Mozambique Currents, "their speed varies much, and the system is complicated by strong counter-currents, which scarcely run two consecutive days alike, and defy all attempts to ascertain a ship's position, without frequent observations. From Delgado Southward the current generally runs $1\frac{1}{2}$ or 2 knots past Mozambique; but between the Comoro Islands and the coast, and thence Southward until past the narrow part of the Mozambique Channel, there is no dependence to be placed on the direction or force of the current; it will run 3 knots one way, and as much another at times."

We now return to that branch of current which flows to N. of Cape Delgado, and is commonly deflected during the N.E. monsoon (Dec. to March) *from* the land *towards* the E., between lat 2° and 3° S.; but occasionally its *reversal* is hastened by strong N.E. winds, bringing their current with them down the African coast, and *then* the E. deflection may occur even below Zanzibar. But this is merely temporary—little more than ephemeral—as the wind that causes it. The current from the Arabian Sea is warm, but that passing Cape Ambre is much cooler, and they are disinclined to join issue at once; so they flow side by side for a short distance before coalescing and produce those rippings so alarming to strangers. They soon arrive, on their E. course, upon the region of the N.W. or middle monsoon (extending from the Amirante Isles to and beyond Java), forming that Easterly return current* which has been *now* for the first time fairly brought to light in the excellent Wind and Current Charts, prepared at the Admiralty by Staff-Commander Hull, R.N.: which make us express surprise that anybody should have attempted to controvert the views of Sir John Herschell as to the harmony between winds and currents.

Across the Middle and Outer passages (*see* farther on) the Trade Drift has no strength of any consequence, the average being about $\frac{1}{2}$ m. an hour, but at the N. end of Madagascar (as well as off the S. end) it becomes a *stream* and runs 40 or 50 m. a day.

When the sun is at greatest N. declination and the S.E. trade blows up to the Equator (which period is also that of the Easterly monsoon among the islands between Borneo and Australia), the Trade Drift is slightly augmented by the current from Torres Strait, and flows Westward past the Chagos and Seychelles groups till within 200 m. of the African coast, along which it is forced to the N. by the trend of the coast, and by the Southerly breezes which also have the occasional effect of turning the Mozambique current Northward in June, July, and August, and causing it to *whirl* round by the S.E. and the S. between the Comoros and Madagascar.

The Chagos and Seychelles Currents run generally with the wind; for four months, June, July, Aug. and Sept. to the West, varying occasionally a little to N. or S. of that direction; in Oct., Nov., and part of Dec. they are very variable (whilst the S.E. Trade is *backing down* from the line as the sun goes Southward); from mid-Dec. to mid-April they run to Eastward, propelled by the N.W. monsoon; in the latter part of April and all May they are again variable.

The Equatorial Channel Currents are very strong; for half the year they set Westward, and for the other half Eastward, according to the monsoon, but are subject to checks from variable winds. In June they commence to set Eastward, and last till the end of Dec., but in July and Aug. when the S.E. Trade blows (but with interruptions) up to the Equator, a *Westerly* set has been experienced between Ad-du Atoll and Phua Moluk;† thus showing how the current obeys the prevailing wind, for most vessels have found throughout July and August an Easterly set of 50 or 60 m. a day through the Equatorial channel. In Jan. the current begins to set Westward, receiving its impulse from the N.E. monsoon of the Bay of Bengal.

The Maldivh Currents. No general description will do for the currents; in the many channels that exist amongst this chain of islands, and as yet there are but few recorded observations, and these are for only a very small portion of the year. Regular tides also occur throughout the group, and a tide may be mistaken for a current. As a general rule the currents set Eastward from June to Sept.; then Southerly along the W. side of the Islands till Dec., in the end of which month they commence setting Westward, strong through the Cardiva and other channels below that to the Equator (but only extending to Ad-du Atoll from mid-Jan. to mid-Feb.), and they run in that direction till April. In May they are variable and uncertain till the S.W. monsoon is established.

Currents about Minikoi. As the N. E. monsoon blows strong through the gulf of Manar and over the low N. half of Ceylon, in Jan. and Feb. the Westerly current runs strongly off the S.

* See Current Chart for the N.E. monsoon.

† Ship Contractor, July 27 to July 29, 1792.

‡ The Indian Ocean Currents are well described, though we cannot adopt the theory of the winds, in "Physical Geography, in its relation to the prevailing Winds and Currents," by J. K. Laughton, Professor at the Portsmouth Royal Naval College: sold by Potter, 31, Poultry, London.

end of Ceylon island, and seems to continue its W. direction till it meets with an obstruction in the long Maldivh chain; then turning to the N. close along the N.-most Atolls towards Minikoi Island, thence to the N.E. and the E., curving down again to S.E.; thus forming a whirl (in the direction of the hands of a watch) to E. of Minikoi.* This may explain what Horsburgh mentioned, that the current sometimes in the N.E. monsoon sets to the N.W. and Northward. In April and May it is variable, but generally to S. with the Northerly winds that prevail until the S.W. monsoon brings its Easterly current of cooler water, which the S.E. trade has brought with it up to the Equator, and which had commenced its strong N.E. *set* up the African coast early in April. Near Minikoi the current sets in Aug. to the E.S.E., and in Sept. to the S.E.; for the remainder of the year between S.E. and South.

The Lakadivh Currents are very weak, and run with the wind during the N.E. monsoon, only tending generally to make the ebb stream run stronger and longer, whilst that of the flood tide is reduced to one or two hours only (*see* tides, Chap. XIV); there is sometimes a set to the Northward when the winds are light and variable, especially after the brisk Northerly winds that prevail for two or three days at a time during the N.E. monsoon, or rather during the *N.-Wester* season of the Malabar coast (*see* Index) when there is almost always a Southerly drain along the shore of Hindostan. From June to Sept. the current sets Easterly and with considerable strength at times, gradually turning to E. by S. in July, till in Oct. it is S.E., and for the rest of the year very feeble and variable according to the wind.

An excellent proof of the strength of the Lakadivh and Malabar current in the S.W. monsoon has been given by the washing up of a seaman's chest near Amblangodde, about 20 m. to S. of Colombo on July 24th, 1865: it came from the ship *General Simpson* (from Bombay bound to Liverpool) wrecked on Chitlac Island on June 19th. There seems a little uncertainty about the day when the chest started on its voyage, but the master of the vessel left her with cargo entire on July 10th. Assuming that as the date, the current was 36 m. a day in a mean S.E. direction.

VARIATION of COMPASS. In the several passages from the Cape of Good Hope to India, attention must be paid to the Westerly variation of the magnetic needle, which amounts to 30° off the south end of Africa; 20° off the south end of Madagascar; 10° at Mauritius; and so decreasing till at the Maldivhs there is none.

PREVAILING WINDS IN THE INDIAN OCEAN.

Navigators have the choice of proceeding by the Mozambique Channel, or any of the routes East of Madagascar, when the S.W. monsoon prevails to the N. of the Equator, which is from April to Oct. The outer passage to the E. of the Chagos Archipelago may also be adopted in the same season, or at any time of the year, by ships bound to Bengal, but ought certainly to be followed by all ships from Europe, or the Cape of Good Hope, bound to Bombay, which cross the Equator from Oct. to March, when N.E. winds mostly prevail in North latitude.

Between Madagascar and Australia the trade wind generally prevails from the S.E. in lat. 26° to 12° S. In Feb. March, April, and May, the southern limit of this trade is frequently extended to lat. 23° or 30° S.; and in these months the wind in some places is often fixed at E. or E.N.E., continuing from these directions many days together. This happens more particularly in mid-ocean, for near the W. coast of Australia the trade wind blows from the S. and S.W.; and to the E. of Madagascar, and near the Islands Mauritius and Bourbon, it is often obstructed by sudden changes.

From the Equator to lat. 12° S., the winds prevail from E. by S. to S.E. by E. during six months; this is called the *Easterly monsoon*, and continues from April to Oct. From Oct. to April, the Westerly winds prevail within the same limits, blowing often at N.W. and N.N.W., with cloudy weather and rain; this is called the *Westerly monsoon*, (the middle monsoon of Captain Forrest) and brings the rainy season; the Easterly monsoon being the dry season to the S. of the Equator.

The Westerly winds are strongest in Dec. and Jan., but never so constant as the Easterly winds in the opposite monsoon, which frequently extend to the Equator, in June, July and Aug., from the meridian of Madagascar to lon. 90° E.; but in proportion as the distance from Sumatra is decreased, the northern limit of the Easterly monsoon recedes to the S., leaving a space of baffling variable winds and calms between it and the Equator.

* E. I. C. surveying brig *Palinurus*, 1853. Captain Selby states, on native information, that the current in Jan. and Feb. always sets past Minikoi to the Northward. We shall learn more about this, if we ever get a light-house erected on Minikoi.

S.W. Monsoon. When the S.E. or Easterly monsoon is prevailing to the S. of the Equator, on the N. side of it the S.W. monsoon predominates, which is the rainy season in North latitude on most of the coasts of India. It commences in April, at the N. part of the Arabian Sea, Bay of Bengal, and China Sea; but seldom till May near the Equator, which is its S. limit; from thence it blows home to all the coasts of India, Arabia, and China, continuing till Oct; this is a changeable month, liable to gales of wind on the Malabar Coast and in the Bay of Bengal.

An inexact account (formerly given) of the commencement and progress of the S.W. monsoon, in both the Arabian Sea and Gulf of Bengal, seems to have caused misunderstanding in the minds of seamen and others about the *backing-down* of the S.W. monsoon. The rarefaction of the air, over the arid plains of Sindh and Cutch, causes an indraught of ocean air so early as mid-Feb., firstly in the shape of a sea-breeze by day, then an almost constant and fresh W.S.W. wind (strongest by day) which only fails about midnight, leaving a light declining breeze from W. by N., veering to N.W., till at sunrise it falls calm and remains so till about two hours before noon. In March, the winds of the Malabar coast become very N.-Westerly.

Again, in the Bay of Bengal, off the Delta of the Ganges, the S. by W. winds commence in March (*See* page 317), as an indraught upon the heated sandy fringe of the delta, although the sun is still below the line; but we must remember that at the vernal equinox, the sun has more nearly approached the zenith of Calcutta at mid-day than it does in England in the summer solstice.

Thus, in the N. portions of both Arabian and Bengal Gulfs, the N.E. monsoon has ceased before April, except in occasional gales from that quarter. But yet it is quite true (as we say at page 304) that the real S.W. monsoon begins about 15 or 20 days earlier at Cape Comorin than at Bombay, and that it *travels up* the coast. Synchronously with its travelling up the Malabar Coast, its South limit is extending more to the S., that is, the area of its range is increasing. This last action is the *backing down* of the S.W. monsoon, so well shown on the Wind Chart for April, May, June. In July, it has *backed down* to the Equator, and is indeed then merely an extension of the S.E. trade, the Middle monsoon (previously occupying that space between Seychelles and Chagos) being now obliterated. But throughout the whole Equatorial region, from N. of the Seychelles to the S.W. coast of Sumatra, there is an immense rainfall and abundant calms and squalls.

N.E. Monsoon. In Oct., or early in Nov., when the N.W. or Westerly monsoon (the Middle monsoon) begins to the S. of the Equator, the N.E. monsoon commences in the Arabian Sea, Bay of Bengal, and China Sea, which continues till April. This is the fair-weather monsoon in the Arabian Sea and in the Bay of Bengal, the winds being more moderate and settled than in the S.W. monsoon. The Equator is the southern boundary of the N.E. monsoon, or general limit between it and the N.W. winds prevailing in S. latitude; but there is often a considerable space between them, subject to light variable breezes and calms.

Bay of Bengal. It may be observed, that the N.E. monsoon should commence in Oct.; but this is seldom the case in the S. part of Bengal Bay; for between Ceylon and the entrance of Malacca Strait, from the Equator to lat. 8° or 10° N., Westerly winds are frequently experienced in Oct. and Nov. which blow strong and constant several days at a time: near the Equator, these winds are mostly at N.W. and N.N.W. In a direct line from Ceylon to Acheen Head, they are from W.S.W. to W.N.W.; and more northward into the bay, they are from S.W. and S.S.W.

In Oct. and Nov., these Westerly winds prevail much about the Nicobars and the entrance of Malacca Strait, and from thence to Ceylon; so that it appears not proper for ships bound to that island, or to the Coromandel Coast, to fall in with Acheen Head in these months; nor is this requisite during any period of the N.E. monsoon, for it must frequently lengthen the passage. It is generally very tedious passing from the W. coast of Sumatra or Sunda Strait to Ceylon, in Oct. and Nov., on account of N.W. and variable light winds.

Hard Gales blow at times against the shores that form the head of the bay, between April and the end of Aug., when the S.W. monsoon prevails with most force; and short gales, or storms, are liable to happen at other times. Gales which prevail during the S.W. monsoon, blow sometimes from S.S.E., but more frequently between S. and S.W., veering at times to the Westward. The end of June appears a most disastrous time for shipping* off the Sand Heads; and the gales are now sometimes proved to be of a *cyclonic* nature, like those of the China Sea at the same period. Gales from the Southward, in some years, have been experienced late in Sept., Oct., Nov., and sometimes, though seldom, in the early part of Dec.; these are doubtless the *tails* of Madras cyclones.

In Aug. a storm happened in the head of the bay, in which several ships were disabled; one

* The *Rothsay*, the *Champion*, and the *Omaha* were lost in the last days of June, 1872; the numerous lives then lost will always make that a conspicuous year.

of them, the *Eliza*, Captain Roberts, was obliged to put into Coringah to repair her damage. In Sept. the ships *Ceylon* and *Walpole* met with a severe storm, which commenced at S.E., shifted to N.E., backing to N.N.W.; blew a hurricane at W., then moderated at S.W. and S.S.W. The *Ceylon*, at anchor in 16 fathoms, in Ballasore Road, cut her cable, went to sea, and had a suit of sails blown away. The *Walpole* was in 46 fathoms water off Point Palmiras, lost her mizen-mast, and sustained other damage in the gale; on the following day she fell in with the ship *Lady Barlow*, totally dismasted. In Oct. the *Indus*, in 18 fathoms water off Point Palmiras, lost her sails, and had a boat washed away by an Easterly gale; the wind afterwards veered to N.W., and enabled her, and other ships in company, to stretch off shore.

The *Montague* carried (from abreast of Acheen Head) S.E. and E.S.E. winds to lat. 13° N., where, on the 10th Nov., a dreadful storm blew away her top-masts; they were also obliged to cut away the mizen-mast, and with three pumps could scarcely keep her free. Strong S.E. winds at this season doubtless marked a cyclone to the S.W. of them, and they ran into it.

N.-Westers are liable to happen near the entrance, and in the river Hoogly, about the changes of the monsoon, particularly in April and May; also in Oct., Nov., and sometimes in Dec. These are sudden severe gusts of wind from the N.W. quarter, generally indicated by a dense cloud rising rapidly from the horizon, accompanied at times by lightning. The violence of some of these N.-Westers is excessive and instantaneous: all the ships moored at Calcutta were driven on shore by one of them, in May; and for a short time it was impossible to walk in the streets. They are, however, seldom so violent, particularly at the entrance of the river, although, on the night of the 5th of Dec., about eight ships riding there, on the look-out for pilots, lost anchors during a gale blowing directly out of the river, with lightning and small rain; whilst a heavy sea rolled in from the opposite direction, occasioned by a strong gale in the bay blowing from the Southward at the same time, and reaching within 30 leagues of the Sand-Heads.

PASSAGE TO THE BAY OF BENGAL.

Ships bound to the **Bay of Bengal**, when they are entering the S. limit of the S.E. Trade, or in about lat. 26° to 28° S., should be in about lon. 80° to 83° E., if they expect to pass the Equator from March to Oct., whilst the S.W. monsoon prevails in the Bay. In standing across the Trade, it often happens that no Easting can be made, the wind blowing more from E. and E.N.E. than from S.E.: this has been experienced in different seasons of the year, but more particularly in March, April, and May, but it is best to keep the sails *clean full*, and not to *hug* the wind, (*See Wind and Passage Charts*). Between the meridians of Cape Comorin and Madagascar, in the W. part of the Indian Ocean the Trade wind is most liable to hang far from E.; but near Java and off the W. coast of Australia it is found mostly at S.E., when the sun has crossed the Equinoctial and is going up N. to the Cancer Solstice.

As the S.E. trade is liable to blow from the Eastward, ships ought not to enter it far to the westward, with the view of running down much longitude whilst crossing, in case of getting near the Maldivh Islands with a scant trade. When they get into lat. 1° or 2° N. from April to Oct., they may be certain of the Westerly monsoon to carry them to any part of the bay. Ships bound to Ceylon or Madras, in this season, should steer to the Northward through the Trade, keeping a little to the W. of the meridian of Point de Galle, if bound there. If bound to Trineomalee, they should make the land to the S. of it, from March to Sept.; and to the S. of Madras from the 1st of Feb. to Sept., when bound there.

Ships expecting to pass the Equator between Oct. and April, bound to the Bay of Bengal, may run to the northward in about lon. 85° E. through the S.E. Trade, which will probably carry them into lat. 12° to 8° S. The Middle monsoon, or variable winds, mostly from the W. to N.W., and squally weather, may be expected to follow, and continue from the N. limit of the trade to the Equator. With these winds, ships bound to Malacca Strait should steer for Acheen Head: but those proceeding for Bengal should keep at a reasonable distance from Hog Island and the N.W. end of Sumatra; for here they are subject to delay by baffling winds and hard N.-Westers, with a current setting into Malacca Strait, particularly in Oct. and Nov., when N.W. and W. winds prevail about the Nicobar Islands and Acheen Head.

It is improper to pass to the E. of the Nicobar and Andaman Islands, although it was *formerly* thought the only secure route to Bengal, during the N.E. monsoon; but it is now well known that light N.W. winds and southerly currents prevail along the Aracan Coast in this season, which makes the passage along it to the N. very tedious. Should any navigator, however, think the passage to the E. of the islands requisite, during the strength of the N.E. monsoon, he ought to pass out to the westward, by the Preparis, or Cocos Channel, and not approach the coast of Aracan.

After passing Acheen Head, at any discrecional distance, from 1° to 2° or 3° , the W. side of the Nicobar or Carnicobar Islands may be approached, if the wind admit, by ships proceeding to Bengal during any part of the N.E. monsoon. If the wind incline to keep from the Westward, the islands need not be approached close; if at E.N.E. or N.E., ships ought to steer up the bay close on a wind to the W. of the islands. In lat. 16° or 17° N., the wind often veers more from the Northward; favourable tacks may then be made to the Eastward at times, to keep from the W. side of the bay; neither should the coast of Aracan be approached, but ships should work to the northward in the open sea, where there is smooth water and moderate breezes, which will enable them speedily to reach the Sand Heads. It has frequently happened in the strength of the N.E. monsoon, that ships, by passing close along the W. side of the Nicobar Islands, have reached the Sea Reefs at the entrance of Hoogly River, without making a tack. Navigators, from Malacca Strait bound to Bengal (who had great experience) never proceeded along the Eastern shore, but adopted the channels between the Andamans, or to the S. of the Little Andaman, or even to the S. of the Nicobars, in time of war. They also proceeded through the channels to the N. of the Great Andaman frequently, but always avoided the coast of Aracan.

Ships crossing the Equator late in Feb., or in March, should keep well to the westward in passing up the bay, for the current then runs to the northward along the Coromandel Coast, and the Madras *along-shore* winds are often between S.W. and S.E.; whereas, in the middle of the Bay, they are variable and light from N.W. to N.E. in this month, with a drain of current at times setting to the Southward.

PASSAGE TO MADRAS.

Ships bound to Madras in Oct., or early in Nov., ought not to proceed too near Acheen Head, in hopes of benefitting by the N.E. monsoon, for they may be delayed by N.W. and Westerly winds. In the middle or W. part of the bay, in Oct., the winds will often be found variable from the S. and W.; with which a ship may speedily get to the northward. During any period of the N.E. monsoon, there seems no occasion, if bound to Madras, to exceed lon. 85° E., and this probably is farther than necessary, for ships which sail well, in crossing the Tropic of Capricorn; then if you make good only a N. by W. course through the Trade wind, you will be all the more to *windward* for your run through the middle monsoon region. Through this a N.E. course (with studding-sails) should be taken to enable the ship to cross the Equator to the Eastward of lon. 90° E., and from about lat. 2° N., to make the N.E. monsoon a fair wind to Madras. Those ships, making ports on the Coromandel Coast, should fall in with the land to the northward of the place to which they are bound, *after Sept.*; for the current begins to set along shore to the southward late in Sept., or early in Oct., and is strongest in Nov. and Dec.; but this, like the monsoons, commences in some seasons nearly a month sooner than in others.

At Point de Galle, and along the S. side of Ceylon, and also in the Gulf of Manaar, between that island and Cape Comorin, Westerly winds prevail nearly eight months in the year. These winds commence in March, and continue till Nov., sometimes till the latter end. Ships, therefore, which pass the Equator after mid-March, bound to Ceylon by the Outer Passage, should steer North, nearly on the meridian of the place to which they are going, or rather keep to the W. of that meridian, as Westerly winds may be expected to the S. and W. of Ceylon, in the space between that island, the Equator, and the Maldivhs, after mid-March, although not always constant. The same course of proceeding is advisable till Nov.,—and even in this month strong Westerly breezes may frequently be expected. In Oct. and part of Nov., the current runs strong to the Eastward between Ceylon and the Equator, but at beginning of Nov., near the land by the Bassas, off Dondra Head and Galle, it has commenced to run strongly to the W., and gradually (as the N.E. monsoon strengthens) this West current extends nearly to the Equator.

The *Anna* passed Point de Galle, Nov. 24th, bound to China; on 2nd Dec. she was in lat. 3° N., and nearly on the meridian of Point de Galle, having experienced a constant current of 38 to 56 m. to the westward daily, from leaving Ceylon. During this time, she could gain no Easting, the current being strong, and the winds light and variable from the Northward. On Dec. 2nd, the W. current abated, and subsequently a drain set to the E., as she reached the middle monsoon.

It is, however, improper for ships bound to Ceylon or the Malabar Coast to cross the Equator far E. in Nov., for, by doing so, their passage may be considerably delayed. The *Woodford* and *Albion*, bound to Bombay, after crossing the Equator, stood into lon. 88° E. in the early part of November, expecting to get the N.E. monsoon; but they had constant Westerly winds, and made the S.E. part of Ceylon in the middle of that month; a continuance of these winds obliged them to beat round the island, which occasioned great delay. Had they crossed the Equator just to E. of

the Maldivhs, then steered direct for Point de Galle, or more Westerly for Cape Comorin, after experiencing the wind constant from the W. quarter, their passage to Bombay would have been greatly accelerated.

The *Belvedere*, bound to Bombay, lost the S.E. trade Oct. 19th, in lat. 7° S., lon. 86° E., and had from hence N.W. and W.N.W. winds, to lat. 1° N. : these N.W. and Westerly winds continued till the 30th, then in lat. $7\frac{1}{2}^{\circ}$ N., lon. 85° E., at which time they veered to W.S.W. and S.W., enabling her to make the Friar's Hood on the 5th of Nov. She reached Point de Galle the 10th, where she was obliged to enter the harbour, to renovate the health of her crew, and did not reach Bombay until the 5th of Jan. By losing the S.E. trade so soon, and crossing the Equator so far to the E., arrival at her destination was greatly prolonged. She should have taken the Boscawen Passage, then have passed through the Maldivhs on an E. by N. course, after losing the S.E. trade.

The *Travers*, bound to Colombo, after crossing the Equator with S. and S.W. winds, in Oct., in lon. $82^{\circ} 30'$ E., had constant Westerly winds. She worked against them, and arrived 2nd Nov. at Colombo. Had she crossed the Equator on the meridian of Cape Comorin, she probably would have reached her port with the Westerly winds without tacking.

FROM THE CAPE OF GOOD HOPE TOWARDS AUSTRALIA, AND TO BOMBAY, CEYLON, AND BENGAL.

After rounding the Cape of Good Hope, vessels bound to the south coast of Australia should run down their longitude on or about the parallel of 39° S., where the wind blows almost constantly from some Westerly point, and seldom with more strength than will admit of carrying sail. In a higher latitude the weather is frequently more boisterous and stormy; there sudden changes of wind, with squally wet weather, are almost constantly to be expected; especially in the winter season, and after passing the islands of St. Paul and Amsterdam. Islands of ice have also been encountered in those regions, as was almost fatally proved by H.M.S. *Guardian*, striking against one in lat. 46° or 47° S., and nearly foundering, in the beginning of summer.

By sighting the islands of St. Paul or Amsterdam, the error of the chronometers may be corrected, if considered necessary. In clear weather, they may be seen from a ship's deck at the distance of 50 or 60 m. The strong Westerly gales and thick weather, met with near these islands in the Austral winter, render caution necessary in approaching them during that season; the colour of the water affords no certain indications of their vicinity, and the seaweed they produce is drifted to leeward in small patches, by the prevalent N.E. current.

Winds. To the S. of the S.E. Trade the winds are variable, from the Westward, and are called the Anti-trades. Between the parallels of lat. 30° and 40° S. the Peninsular and Oriental Steam Navigation Company's ships have found the prevailing winds from S.W. and N.W. But between the parallels of 40° and 44° S., from the meridian of the Cape of Good Hope to Tasmania, strong winds from N. and N.N.E. have been frequently encountered, shifting sometimes suddenly from N.W. and from Westward. Captain Horsburgh, in the early editions of this East India Directory, remarked that several ships have experienced these Northerly winds when steering for Bass Strait, which drove them to the S. of that route, and obliged them to proceed southward round Tasmania. The Australia Directory, published by the Hydrographer of the Admiralty, has the following valuable remarks on this subject:—

Great Circle and Composite Tracks. Although the parallel (above assigned) of lat. 39° S., as being that where ships may safely run down their longitude, has been objected to by some writers on the ground that of late years many successful passages have been made in much higher latitudes, some even attaining the 53th parallel for the S. point of their great circle or composite route;—still, it has been deemed desirable to retain the directions given in former editions of this work, placing before the navigator the grounds for this decision.

It is true that the distance from the meridian of the Cape of Good Hope to Bass Strait, or the S. coast of Tasmania, is diminished greatly as every succeeding higher parallel of latitude is adopted. For example, the 40th parallel has an advantage over the 38th parallel of 380 m., or nearly two days sailing; and again the 45th parallel has an advantage over the 40th to the extent of 650 m.; the 50th over the 45th of 480 m.; and so far, the higher the latitude of the great circle or composite route adopted the more advantageous is the route in point of distance. But the disadvantages, attending the selection of any high parallel, should be clearly understood by the seaman, and more especially as regards a passenger ship, a small or ill-found vessel, or one deeply laden.

Maury, in advocating the higher parallels of latitude, says;—"In recommending this route, which differs so widely from the favourite route of the Admiralty, I do it, not because it is an approach to the great circle route, but because the winds and the sea and the distance are all such

as to make this route the quickest;" and again, "The winds to the North of the 40th parallel of S. latitude are much less favourable for Australia than they are to the South of that parallel."

The evidence in favour of these opinions as to the winds and seas being more favourable South of lat. 40° appears however by no means conclusive; many experienced navigators are of opinion that North of lat. 40° the steadiness and comparative moderate strength of the winds, combined with the smoother seas and more genial climate, compensate by comfort and security the time presumed to be saved by the shorter route made in the tempestuous gales, the sudden, violent, and fitful shifts of wind, accompanied with hail and snow, and the terrific and irregular seas which have been frequently encountered in the higher parallels adopted.

Independently of the extreme severity of the climate occasionally experienced in high latitudes, there exists the lurking danger of disrupted masses of ice and icebergs of larger dimensions. The absence or approximate positions of these dangers cannot be depended on for any season of the year, they are however rarely encountered North of lat. 40° S., except in the vicinity of the Cape of Good Hope. Between lat. 40° and 45° S. they have been occasionally fallen in with extending as far as the 65th meridian of E. longitude; on the 45th parallel, as far as 135° E.; and on the 50th parallel extending to 140° E. (*See Iceberg Chart at page 80.*)

PASSAGES TO BRITISH INDIA.

Middle Passage is that to the E. of the Madagascar Archipelago, having this and the Seychelle Islands to the W., and the Chagos Archipelago to the E.

Boscawen Passage, named after Admiral Boscawen, who, with a fleet of 26 sail, proceeded from the island Mauritius to India by this passage, is more to the Westward, or directly to the N. of the islands Mauritius and Bourbon, towards the island Galega, and to the W. of Cargados Garajos and Saya de Malha Bank; then from Galega, to the E. of the Seychelle Islands. This route is shorter than the Middle Passage, and would be generally preferred, were the positions of all the low dangerous islands and banks adjoining to it correctly known; but as all of them are not, ships proceeding by this passage, if not certain of the longitude, should get a sight of Mauritius or Bourbon in passing, and afterwards of Galega, steering the course requisite to avoid the dangers on either side of the passage.

Ships destined for Bombay or the Malabar Coast, which do not pass the Cape before mid-Aug., ought not to proceed through the Mozambique Channel, but should adopt one of the passages on the E. side of Madagascar, and the Middle Passage, or Boscawen Passage, may be considered the most advantageous, the route by these being more to the E.; consequently, a ship proceeding by them will be nearer to the coast to which she is destined at the approaching N.E. monsoon. If a ship pass the Cape of Good Hope between mid-Aug. and mid-Sept., bound for the Malabar Coast, or Bombay, and intending to adopt the Middle Passage, she should get in about lon. 67° or 68° E., when crossing the parallels of 26° or 27° S., in case the Trade wind be far from the E., which frequently happens: this, however, is most common in March and April. When she has got into the S.E. Trade, a *true* North or N. by W. course is proper, keeping in about lon. 66° E., which will carry her well to the E. of Cargados Garajos Shoals, and the Saya de Malha Bank. The Variation of Compass will decrease quickly in running to the N. It is impossible to say how far a ship will carry the trade by this route in Sept. or Oct., for in these months the winds may be found different in one year to what they are in another. The currents are also liable to the same changes between the Equator and the N. limit of the S.E. Trade in the same months.

Bound to Bombay by the Southern passage from Malacca Strait, the *King George* crossed the Equator in lon. 65° E., Sept. 5th; on the 8th, in lat. 3° N., the wind shifted from S. to N.N.W. and N.W., and the current set to N.E. till the 11th, in lat. 5° N., lon. 66° E. From hence the current set to the Southward 6 to 20 m. daily, and gentle breezes prevailed constantly between N. and N.W. till she made Barsalore Peak and Pigeon Island, Oct. 1st., having passed to the W. of the Lakadivh Islands. The wind sometimes veered to N.W. by W. and N. by E., but in general it was fixed between N.W. by N. and North. Next year, the *Anna*, from China, lost the S.E. trade, Aug. 22nd, in lat. 1½° S., lon. 65° E.; from hence had light variable winds, and a current to the S.E. of 16 to 30 m. daily, till she crossed the Equator Aug. 29th, in lon. 63° E.; had then a Southerly wind two days, and lost the adverse current; in lat. 4° N. she got a steady S.W. monsoon on the 31st, with which she reached Bombay on the 9th of Sept. The *King George*, in the preceding season, was only 7 days later in passing the Equator, nearly in the same longitude, and found that the S.W. monsoon had completely ceased.

The *Anna* (the voyage following) from China, proceeding, *improperly*, by the same route to the

N. of the Chagos Archipelago, the S.E. trade failed, Sept. 7th, in lat. 4° S., lon. 75° E.* The wind then veered to S.W. and W.S.W., and soon after to W. and W. by S.; she kept tacking with these winds till the 11th, to endeavour to get to the westward; but finding this impossible, bore away to the eastward of the Maldivh Islands, and made the land near Anjenga on the 18th Sept., having experienced steady winds at West, till she made the land. On the Malabar Coast the current set constantly to the southward, and the winds were unsettled at N.W. and from Westward, which made it very tedious getting to the N., and prevented her from reaching Bombay till the 21st Oct. The *Anna* should have passed to the S. of Diego Garcia, then across the Equator in lon. 61° or 62° E.; she could have passed to the W. of the Lakadivhs as in the preceding year.

The S.E. Trade is lost sooner to the S. of the Maldivhs and Ceylon, than it is farther to the W., near the Seychelles. When a ship has lost the Trade, she should, in proceeding to the N., endeavour to keep between lon. 65° and 68° E., in case of meeting with light winds and E. currents near the Equator, which might carry her near the Maldivhs. When she has reached lat. 3° or 4° N., in Oct. and Nov., Northerly winds may be expected, which will probably keep more to the E. of the North point. With these N. winds and S.E. currents, it is of little use trying to pass to the W. of the Lakadivhs; but a cut may be taken through the Cardiva or other convenient channel, if she cannot pass to the N. of all the Maldivhs; she may then stand to the N.E., upon a wind till the coast is seen. If bound to Bombay, or the S. part of Malabar Coast, or Gulf of Manaar, she may pass through the Eight or Nine-Degree Channel, or through the One-and-a-half-Degree Channel, if bound to the Bay of Bengal. A ship bound round the E. coast of Ceylon, adopting the Boscawen passage in March, April, Sept., or Oct., may run to the eastward, keeping nearly on the Equator, or a little South of it, and pass the Maldivhs through the One-and-a-half-Degree Channel, or the Equatorial Channel.

Ships which sail from Mauritius for Ceylon, or the Bay of Bengal, from March to Sept., may steer to the N. on either side of Cargados Garajos, then to the E. of the Seychelle Islands, and pass through the Equatorial Channel, or the One-and-a-half-Degree Channel of the Maldivhs. The latter channel may be used as well as the Eight or Nine-Degree Channel by ships coming from the Mozambique Channel towards Ceylon or Madras in the S.W. monsoon. Several ships bound from Mauritius to the Bay of Bengal in Nov., Dec. and Jan., have steered to the N.N.E. by Boscawen Passage till they got within 3° , or 2° of the Equator; then with the Westerly winds, which are usually then found near the Equator, they steered to the N.E. as far as requisite. This route, however, is sometimes tedious. The parallels of 1° to 2° or 3° S. lat. are considered proper for outward bound ships with these N.W. and Westerly winds to run down the Easting. The following instance will show that this equatorial route is sometimes precarious. The *Sherburne* left the Cape of Good Hope Oct. 20th, 1833, with Sir Charles Malcolm, the superintendent of the Indian Navy, on board, who was to be landed at Point de Galle in passing Ceylon, as the ship was bound to Bengal. On the 28th Nov.† she crossed the Equator in lon. 75° E., and had then light airs, with a S.W. current, till the 12th Dec., which prevented her from reaching Ceylon; at this time a N.E. wind was experienced when within 50 leagues of Point de Galle, and a W. current (setting towards the Maldivhs) obliged her to re-cross the Equator; but no Westerly winds were then found to the Southward, as they blew from S.E. (*See Wind and Passage Chart for Oct., Nov., and Dec.*) Afterwards, in proceeding up the bay for Calcutta, winds prevailing from the North (instead of the N.E. monsoon) greatly protracted the passage to Bengal, and reduced them to a state of distress for want of water and provisions.

From the Cape of Good Hope, the route by the middle or by Boscawen Passage may be taken previously to the setting in of the S.W. monsoon; but the passage on the E. side of Madagascar seems preferable at such times. Captain Horsburgh, however, twice in March proceeded by the Middle Passage to Bombay. He left the Cape in the *Carron* on Feb. 6th, got the Trade on March 6th, in lat. 26° S., lon. 67° E.; in crossing it, the wind was seldom at S.E., or even at E.S.E., but in general fixed at E. by N., veering from E.N.E. to E. by S. On the 13th, lost the Trade wind in lat. 10° S., lon. 64° E., having experienced a daily current to the Westward. On March 20th, in lat. 4° S., lon. $62\frac{1}{2}^{\circ}$ E., the current changed, and set four days to the Eastward, at the rate of 62 and 64 m. daily; but when in lat. 2° S., lon. 60° E., on the 23rd, it abated. From March 13th, at losing the Trade, the winds were very variable till April 1st. In lat. 4° N., lon. $60\frac{1}{2}^{\circ}$ E., the *Carron* got a remnant of the N.E. monsoon unexpectedly, and a daily current to the

* The Wind and Passage Chart for Sept. now shows that such an event might have been expected there.

† She must have had Westerly winds for some 300 m. before she passed the Equator, and with them she should have run an E. by N. course to cross the Equator in about lon. 85° E., then the N.E. monsoon would have been fair to fetch Point de Galle.

Westward, till in lat. $11\frac{1}{2}^{\circ}$ N., lon. 56° E., on April 7th. Here she was involved by calms and faint airs for seven days. On the 14th, in lat. 14° N., a steady breeze commenced at West, and veered gradually to the N.W. and N.N.W., with which she arrived at Bombay on April 24th.

The *Anna* left the Cape on Feb. 15th, and got the S.E. Trade on March 8th, in lat. 28° S., lon. 69° E. The wind, in crossing it at this time, kept generally at E.S.E. and S.E. by E.; but she lost it in lat. 13° S., lon. 69° E., on the 14th. From this time she had the current changeable, mostly setting to the southward, with very light variable winds, till passing the Equator on March 29th, in lon. 68° E.; and then the wind from N.N.E. to N.N.W., in general, with which she tacked often till April 12th; then in lat. $7\frac{1}{2}^{\circ}$ N., lon. 69° E. From hence, the wind kept mostly between N. by W. and N.W., with a Southerly current in general, she stood to the N.N.E., only making a few short tacks to the W. occasionally, till she cleared the N.W. limit of the Lakadivh Islands on the 18th, without seeing any of them. After making the coast at Viziadrug, arrived on April 29th at Bombay, having experienced no remnant of the N.E. monsoon, as she did on the former voyage, in lat. 4° N.; although at this time she reached the same latitude only one day later.

PASSAGE to the E. of MADAGASCAR. In the Mozambique Channel, as there are light variable winds at times, particularly in Aug. and Sept., many navigators prefer to pass to the E. of Madagascar, where winds are more steady. Ships may proceed by this route from April to Oct.; and although the distance by it is somewhat greater than the passage through the Mozambique Channel, this is rendered of no importance, by having better winds, particularly in Aug. and Sept. A ship intending to follow the route to the E. of Madagascar, after passing the Cape, should get into about lon. 52° or 53° E. before entering the Trade region, or in crossing the parallel of 27° S.; for she may find it impossible to make any Easting in the Trade, till she get to lat. 18° or 19° S.

Adjacent to the S.E. part of Madagascar, E.N.E. winds prevail, extending several degrees from the land. These are called *Fort Dauphin winds* by the French, as they mostly prevail along that part of the coast, and sometimes force a current to the S.W. 40 and 50 m. daily, near the shore; therefore a ship, intending to touch at Fort Dauphin for refreshments, ought to fall in with the land to the N. of the bay. If she fall to leeward, it will be difficult to beat up against the current; but it does not extend far from the land. These winds and currents do not, however, appear always to prevail; for the *London*, in the end of April, made the S. part of Madagascar bearing W.S.W. about 6 leagues off; and had fresh gales from S.S.W. to S.S.E. From hence, she steered for Bourbon, passed in sight of that island on the W. side, and anchored at Port Louis on May 17th.

In steering to the N. through the Trade, a ship should continue in lon. 51° to 52° E., till she is in lat. 15° S., being then past Cape East, where the coast trends to N. by W., she may edge in, and make the land at discretion. It should not be made to the S., near the deep Bay of Antongil, as there might be difficulty in getting to the N.E., round Cape East. If a ship do not make the land to the N. of Cape East, she ought to see Cape Ambre, for a point of departure, which is a low point of land, terminating in a ledge of rocks above water, with several conical hills near it to the S. In passing along the N.E. part of Madagascar, the coast appears sterile, and the shore rocky; a little inland, the country is mountainous. A course made from Cape Ambre, between true North and N. by E., is the safest track, till clear of the small islands which lie to the N.E. and N.W. of it: she may from thence steer a direct course N.E. for Bombay. A ship should not make above $1\frac{1}{2}^{\circ}$, or at most 2° E. by chronometer from Cape Ambre, till past the African Islands. It must be observed, that off the N. end of Madagascar, the current generally runs strong to the Westward all the year round. From Cape East to Cape Ambre, it sets along shore to the northward, and the wind on this part of the coast generally veers to the S.E. when the sun is in the Northern hemisphere.

Caution. The *Ocean* and *Addington* went this passage too early in the season; they left the Cape Feb. 25th, and did not go to the E. of lon. $51^{\circ} 20'$ E., in passing Madagascar. The trade prevailed mostly at E. by S. and E.S.E. On the 16th March they stood to the westward to make Cape Ambre, but did not see it. From lat. $13^{\circ} 40'$ S., lon. $50^{\circ} 40'$ E., they made a N. course (by compass) 154 m., then steered N. by E. From lat. 5° S. to 10° N., the winds were very light and variable, which prevented their reaching Bombay till the 7th of May.

The *Anna* passed Cape Agulhas on June 27th; got the Trade wind on July 11th, in lat. 27° S., lon. 51° E.; between lat. 25° and 20° S., the wind was mostly at E. by N. and E.N.E., sometimes N.E. by E., which obliged her to make two short tacks. Finding themselves in lon. $50\frac{1}{2}^{\circ}$ E., they were afraid of getting near the land with the Fort Dauphin winds, but experienced no Westerly current. In lat. 19° S., the wind veered to E.S.E., next day to S.E.; on July 17th she made the coast in lat. $14^{\circ} 20'$ S., and steered along it to Cape Ambre; from this cape she steered N.N.E.

till in lat. 5° S., then N.E. till she reached Bombay on July 31st. On the day she passed Cape Ambre, had 45 m. Northerly current: it set strong in this direction along the shore South of the Cape, and also beyond it to the N.W.

FROM CAPE OF GOOD HOPE TO REUNION (BOURBON) AND MAURITIUS; AND FROM THENCE TOWARDS INDIA.

In sailing from the Cape of Good Hope towards any of these islands, the Easting must be made in a high southern latitude, as best corresponds with the season of the year, agreeably to the instructions already given for proceeding towards India. In entering the Trade or passing the parallel of lat. 27° S., a ship should be on the meridian of the island to which she is bound, that she may not be obliged to haul close to the wind, should it hang from the E. If bound to Rodrigue, the parallel of lat. 27° S. may be crossed in about lon. 63° E.; if to Mauritius, in about lon. 58° E.; or in 57° E. if bound to Bourbon. (*See Winds at Rodrigue, page 525*).

When the sun has great N. declination, it may not be absolutely requisite for ships which sail well, to reach the meridian of their port so far to the S., as the Trade winds then blow more from S.E. and E.S.E. in general than from E. and E.N.E.

It must also be observed that there is a kind of *Northerly monsoon* in the vicinity of Mauritius and Bourbon from Nov. to April; during which period the winds are very variable, often from N.E. to N.W., particularly from the latter quarter. From Oct. to May gales of wind are liable to happen in these seas; at Reunion (Bourbon) there are generally one or two each season, and in some years a hurricane. Although these *cyclone* storms have been known to happen in Dec. at Mauritius, also in Jan. and Feb., they are more liable to be encountered in March or April, when they blow very severely, and even more frequently than the hurricanes in the West Indies.

THE MOZAMBIQUE CHANNEL PASSAGE.

The Route by the Mozambique Channel is more direct than any other, for ships bound to Bombay, Ceylon, or the Coromandel Coast, when the S.W. monsoon prevails on those coasts, for it predominates in the Mozambique Channel at the same time. This route is generally preferred in times of peace; but in war, many navigators have adopted the passage to the E. of Madagascar, where they are not so liable to light winds, nor to fall in with shoals, as in the inner passage. The passage outside of Madagascar, although the distance is greater, may, by these advantages, be made as quickly as the other; and instances have occurred of ships separating to the eastward of the Cape, some adopting the inner passage, and others the outer passage, the latter arriving first at Bombay.

In entering the Mozambique Channel, and bound to the Comoro Islands, a ship departing from Sandy Island, or having seen the land about St. Augustine Bay, may steer N. by W., or N.N.W., until 8 or 10 leagues from the shore, then steer about N. by E., or perhaps North. The direction of the coast to Point St. Felix, in lat. $22^{\circ} 36'$ S., is about N.N.W. (*true*) or rather more Westerly in some places. A North and N. $\frac{1}{4}$ W. course may be steered in the day, which is parallel to the coast as far as Point St. Felix; but in the night the coast should not be approached close, for high breakers stretch along it; and it is low in several places near the sea, composed of sand-downs, with verdure interspersed. Point St. Felix is a sand-hill, with some trees on it. From Cape St. Vincent, it takes a N.N.E. direction towards Moroundava, having several sand-banks between them, from 3 to 4 leagues off shore.

A good look-out is requisite when crossing the parallels of Juan de Nova, and the Chesterfield Shoal; and from hence a direct course may be steered for Johanna, if to touch there; in such case, it will be proper to pass between it and Mohilla. If not to stop at any of the Comoro Islands, pass through any of the channels between them, or to the W. of Great Comoro, as circumstances require. Amongst these islands the current generally sets Westward, rendering it prudent, when bound into Johanna, early or late in the season, not to fall to the W. of Mohilla, as the winds are frequently light and variable at these times. The route here described is recommended in preference to that along the coast of Madagascar, over the Parcel Bank; but the latter having been much used in former times, it is proper to point out the contiguous dangers.

Ships running for the Mozambique Channel, after leaving the Cape Bank, are liable to strong S.W. and Westerly currents. Many ships, after shaping a course for the middle of the channel, have fallen in with the African Coast. The *Doddington*, steering in the night E.N.E. by compass, struck a little to the Eastward of Algoa Bay, and most of the crew perished. The *Grosvenor*, bound home, was wrecked farther to the N.E.; the crew and passengers, after reaching the shore,

and suffering great hardships, were thought to have fallen a sacrifice to the natives, but three or four of them reached the Cape. Since that time, other ships have been wrecked on this coast, from errors in their reckoning, and from Westerly currents.

Although the current generally sets to the W. and S.W. between the S. end of Madagascar and Cape Agulhas Bank, it sometimes (in the Austral summer months) sets to the S.E., between Cape Corrientes and the Europa Island, and towards Madagascar Island with considerable velocity, producing a contrary error in the reckoning. The *Prince of Wales* and *Britannia*, in company, fell in with the land about midnight, near St. Augustine Bay, when they supposed themselves near mid-channel. The *St. Jean Baptiste*, a French Indiaman, was lost on the Star Bank, on account of the ship being to the E. of her reckoning: and 39 only, out of 120 people, were saved. They reached St. Augustine Bay in the boat, and on landing were made slaves by the natives; 19 only of the 39 survived their captivity, in which they remained 7 months, and then were ransomed by a Dutch ship. These examples of errors in the reckoning, both to the E. and the W., (though the dates are not given) evince the propriety of caution in running for the Mozambique Channel, when not confident of the longitude.

Ships bound to the Mozambique Channel, to guard against the S.W. and westerly currents, which may be expected after passing the Cape Bank, should not edge away too soon to the N., particularly if it be intended to see the coast of Madagascar to the S. of St. Augustine Bay, or to stop there for refreshments. At most times it will be proper to reach lon. 10° E. before crossing the parallel of lat. 34° or 35° S., or shaping a direct course for the channel.

It was the practice of most navigators to get a sight of Madagascar, near St. Augustine Bay, and then to steer a course along this side of the channel, to get soundings on the Parcel Bank, on which are several dangers, and the soundings mostly coral rock; and there are other dangerous spots in several places near this shore. It therefore appears that the track near mid-channel is preferable when the longitude can be relied on: for here the winds are more steady, and no dangers exist except the Bassas da India and Europa Island, the parallels of which must be crossed with great caution, particularly during the night. These may be passed either to the W. or the E.; and when to the N. of them, a course should be steered to pass to the W. of the island Juan de Nova, direct for Mohilla, or Comoro.

Some further remarks about this passage will be found at page 554.

FROM THE COMORO ISLANDS TOWARDS INDIA.

Passages of Ships, showing Winds and Currents. The ship *Essex*, bound to Bombay, got winds from the Northward on 15th Sept., and reached Johanna on the 28th. She left this island Oct. 3rd, and the day following was drifted by the current to the W. of Comoro, almost close to the rocks, during the night, when calm; the current, which swept round a point of the island, was then deflected by the bluff rocky shore, and she had no soundings, although the boat lay upon a rock where the water was shoal, at a small distance in shore. From hence she had S.E. winds to the Equator, and crossed it on the 15th; S.W. and Westerly winds then prevailed till in lat. 6° N.; winds from N.N.W. followed till in lat. 10° N. on the 27th; she had afterwards N.N.E. and Northerly winds until her arrival at Bombay on 17th Nov.

H.M.S. *Leopard*, the late Admiral Blankett, bound to the Red Sea, anchored at Johanna, Oct. 29th; and the *Dædalus* saw the Island of Mayotta on the same day, but did not reach Johanna Road till the 5th Nov., owing to light winds and Southerly currents. They sailed on the 11th, had light variable winds, made the coast of Africa on Nov. 24th, in lat $0^{\circ} 44'$ N.; the current began to run strong to the southward along the coast, sometimes more than 2 m. an hour, during the time they continued to beat against the N. winds, until the 14th Feb., without gaining ground. During this period, they were generally within 30 m. on either side of the Equator, and kept near the shore. Provisions began to fail, and the *Dædalus* was despatched, 14th Jan., to the Cape of Good Hope, after transferring most part of her provisions to the *Leopard*. This ship, with the *Orestes* sloop in company, continued to beat without effect till the 14th Feb., when they bore away for Zanzibar, to procure provisions and refreshments, and arrived there on the 20th. They sailed again on the 5th of March, coasted along to the N., and had now the current generally favourable, but the wind often contrary. Continuing to coast along shore, they passed Cape Guardafui on April 8th, and anchored on the 11th, in Aden Road.

H.M.S. *Imogene*, left Zanzibar on February 7th, 1834, kept near the Equator, crossed it in lon. 58° E., stood then to the northward till near Socotra, March 12th, and reached Bombay on the 29th, with continued N.E. and N.N.E. winds.

The *Ascension* was close to the Comoro Islands late in Oct., and had stormy weather in the S.

part of Mozambique Channel; she touched at the island Pemba on the African coast to obtain refreshments, but was obliged to leave it, in consequence of the perfidy of the natives, who at first appeared friendly, but afterwards enticed some of the crew on shore, and then assaulted them. After leaving this place, she continued to beat about at sea until she fell in with a group of uninhabited islands, abounding with cocoa-nuts and other refreshments. The contrary winds continued till late in March, which prevented her reaching Aden Road before April. Captain Saris, with the *Clove*, *Hector*, and *Thomas*, left Mohilla in Nov., made the coast of Melinda in Dec., and were carried back to lat. 5° S. by the currents. They made the coast above the Equator on Jan. 1st; had strong Easterly winds here, and Southerly currents; but more to the S., light airs and strong rippings when they stood out to seaward. From Ras Hafoon, which they made early in Feb., they stood out to sea, and saw it again in eight days after, owing to Westerly currents, and arrived at Tamarida Road, in the island Socotra, having a passage of 14 weeks from Mohilla, against the monsoon. These ships made a passage (bad as it was) by keeping mostly out from land, while the *Leopard* could not effect it along the coast.

From Mohilla they should have stood to the N. by W., up to the latitude of Zanzibar; then to the Eastward, passing to the S. of the Amirante Islands, and getting into the Westerly winds and Easterly set of the Middle Monsoon, passing to the N. of the Saya da Malha. In this region, at that season, N.W. winds prevail. A vessel, going N. from the Comoro Islands for 300 m., could (with those winds) pass to the N. of the Seychelles, and stand on an E. $\frac{1}{4}$ N. course till she nears the S. islands of the Maldivh chain; then making Northing till she gets the N.E. monsoon, and turning round with it, she could fetch Socotra. This passage would not occupy above a month or five weeks.

The *Mary*, from England, bound to the Gulf of Persia, left Table Bay, Cape of Good Hope, saw the coast of Natal in lat. $29\frac{1}{2}^{\circ}$ S., the 7th Sept., having experienced a current of 180 leagues to the W. from leaving Table Bay. She had light winds and S. currents in the Mozambique Channel; watered at Johanna, sailed from thence on the 4th Nov., had variable light winds and calms, passed between the African Isles and those of the S.W. part of the Seychelle Archipelago on the 6th Dec., then stood to the E. on the S. side of the Island of Mahe and those near it; left the E. edge of the bank on the 21st Dec., and steered E. and N.E. for a few days, with variable winds between N. and S.W., which veered to N.E. and E. when near the Equator; steered then between N.N.E. and N.N.W., making a tack to the Eastward at times. Saw the E. end of Socotra, having experienced 140 leagues of Westerly current since leaving Johanna; saw the coast of Arabia near Cape Chansley on Jan. 20th, had here land and sea winds from N.E. to S.E., which drew to the Southward when off Cape Isolette, with which, rounded the island Mazeira on the 30th, made an occasional tack at times, passed Ras-el-had 1st Feb., and arrived on 18th at Gombroon.

These ships, being late in the season, ought to have avoided the Mozambique Channel and the African coast. Had she proceeded to the E. of Madagascar, and between Diego Garcia and the Seychelle Islands, the *Essex* would probably have reached Bombay more speedily. The others, destined for Aden and the Red Sea, by following the same route, and then verging towards the W. limit of the Maldivh Islands until they had reached lat. 6° or 7° N., would there have met with N.N.E. winds, and there is reason to think their passage would not have been tedious.

DIRECTIONS. Whether bound to the Red Sea, the Persian Gulf, or to India, it seems improper to proceed through the Mozambique Channel after Sept. on account of light baffling winds and strong S.W. and Southerly currents, which frequently prevail in Oct. and Nov. among the Comoro Islands, at the change of the monsoon, and throughout the N.E. monsoon.

From Johanna, leaving in Oct. or Nov., and going towards the W. coast of India, a course about N.N.E. is proper to the parallel of lat. 8° S., to avoid falling in with the Aldabra Islands; and in crossing their latitude, a good look-out is requisite. From the parallel of lat. 8° S., a course more N.E., and when above the Seychelles an E. course ought to be steered, to run down the Easting through the Middle Monsoon region, till past the Maldivhs, then make every effort to reach Cape Comorin, whence the land and sea breezes in Nov., Dec., and Jan., will speedily carry a ship to Bombay.

In running from the Comoro Islands to the Equator, during the Southerly monsoon, the winds generally prevail at S.S.E., increasing in strength as the latitude is decreased; and they veer to S.S.W. and S.W. in N. latitude. From the Equator, a ship bound to Bombay may steer a direct course in the S.W. monsoon for that place, taking care to get on the parallel of the island of Kenery, at a considerable distance from the coast, and then steer directly E. for it.

At the conclusion of the Southerly monsoon, a ship leaving the Comoro Islands should steer more easterly than during the strength of the Southerly winds, to counteract the prevailing Westerly currents to the N. of those islands.

If bound from the Mozambique Channel, or from Mauritius, to the S. part of the Malabar Coast, or to Colombo, near the close of the S.W. monsoon, a ship may steer a course from the Equator to pass through the Eight or Nine-Degree Channel; but if bound to the S. part of Ceylon, or the Coromandel Coast, the One-and-a-Half-Degree Channel seems preferable, being more direct, and equally safe as the former.

In passing through the Nine-Degree Channel in thick weather, and uncertain of the exact latitude, if the island Minicoy is seen, pass on either side, as seems most expedient; but great caution is requisite in approaching any of these islands in thick weather, or in light winds; for they are all very low, with extensive coral reefs contiguous to them, close to which there are no soundings. One of the P. and O. steamers was lost on Minicoy in a fog.

If the Eight-Degree channel is adopted when bound to the Coromandel Coast, and certain of being to the E. of Minicoy, a direct course may be steered for Point de Galle; if uncertain of the longitude, steer to the Eastward, until soundings are obtained on the bank adjacent to Cape Comorin, anywhere between lat. 8° N. and 9° N. The depths are from 45 to 50 fathoms 8 or 9 leagues off the coast, at which distance the high land will be easily seen in clear weather, but the weather being generally hazy during the S.W. monsoon, the land is seldom visible until near it; a course, therefore, must be steered to the S.E., when soundings are obtained. In steering from Cape Comorin for Point de Galle, a course should be adopted to place a ship in the latitude of the latter, at a reasonable distance from it, for the current at times sets into the Gulf of Manaar; and near Point de Galle the wind is sometimes at S.S.W., which might cause considerable delay, were a ship not able to clear the S.W. extremity of Ceylon with that wind. About a century ago, several ships from England, bound to Madras, got into the Gulf of Manaar, by errors in their reckoning, in the strength of the S.W. monsoon; but their journals show that by making a few tacks, they all got round Ceylon without difficulty. If the position be correctly known, or any of the islands be seen in passing through either the Eight-Degree or Nine-Degree Channel, there will be no cause to steer for soundings off Cape Comorin, but a direct course may be pursued for Point de Galle.

PASSAGE FROM ST. PAUL TO SUNDA STRAIT.

Ships bound to Sunda Strait, or Bencoolen, may run several degrees to the E. of the meridian of St. Paul Island, before they edge away to get into the S.E. trade; they may afterwards keep away gradually to the N.E., and cross the tropic of Capricorn in about lon. 98° E., or about 100 m. to the E. of the Keelings Islands (or even *sight* them) between Sept. and March. From March to Sept. they should get on the meridian of Java Head, several degrees from it, and steer North; the S.E. Trade sometimes prevailing Easterly in March, April, and May, with a current setting to the W. along the S. coast of Java, with the Easterly monsoon, from March to Sept., renders it indispensable to keep to the E., and not fall to leeward of Java Head, if bound into Sunda Strait in this season; ships should therefore endeavour to make Klapper Island, or Java Head itself, if certain of the longitude.

In May, June, and part of July, ships bound to Bencoolen need not make Java Head, but they will probably make the quickest passage by steering direct for Engano, and from thence for Bencoolen, as the winds admit; because in these months the winds often veer to the N.W., with S.E. currents, which enable the small coasting vessels to come from the N. to Bencoolen.

From Sept. to March, N.W. and Westerly winds often prevail between the N. limit of the S.E. Trade and the Equator, which is called the Westerly, or the N.W., or Middle monsoon. In Dec. and Jan., the Westerly and N.W. winds are generally strong, extending from lat. 1° or 2° N. to 12° or 14° S. These winds force a lee current before them to the Eastward, which runs strong along the S. coast of Java, the weather being then mostly dark and cloudy, with much rain. Several ships, in this season, having fallen in with the land to the E. of Java Head, found it impossible to beat round against the Westerly winds and the strong currents setting to the E.; they were, therefore, obliged to steer Southward, re-entering the S.E. trade, where they made Westing sufficient to pass to the W. of Java Head.

In the season when Westerly winds prevail, a ship bound to Sunda Strait ought *not* to proceed to the N. on the meridian of Java Head, but should steer direct for Engano Island, taking care to pass Java Head well to the W., as the winds are often variable between W. and N.N.W. near Engano and the entrance of Sunda Strait. When nearly on the parallel of Java Head, and 1° or 2° to the W. of it, a direct course may be steered for the Strait, with an allowance for a probable current setting to the S.E. These instructions may be followed from Sept. to March, and ought certainly to be adopted in Nov., Dec., Jan., and part of Feb., when the Westerly monsoon usually predominates.

In this season, a ship bound to Bencoolen should steer to the Northward after losing the S.E. trade, keeping nearly on the meridian of Acheen Head till she is well to the N. of the Keelings Islands, or approaching the latitude of Java Head; she will then probably meet with N.W. winds, with which a course may be followed to fall in with Trieste (Reefs) Island; or she may pass to the N. of this island, between it and the island of Larg, if the wind prevail from the Northward; but should it incline from the S.W. or from S. as she approaches the former island, a direct course to the S. of it may be pursued for Bencoolen.

PASSAGE BETWEEN INDIA AND SUNDA STRAIT.

Ships proceeding from Ceylon or the Coromandel Coast for Sunda Strait, whilst the S.W. monsoon is prevailing in North latitude, and the S.E. monsoon in South latitude, from March to Oct., ought to run down great part of their Easting with the S.W. monsoon, before they cross the Equator. If they cross it in lon. 94° or 95° E., Southerly and S.S.W. winds, with variable squalls may be expected to carry them to the S.E.; and a reasonable distance from the islands off the W. coast of Sumatra may be preserved, by making a tack to the S.W. at times, when the wind veers to the S.E. A drain of current to the Northward may sometimes be experienced, but the prevalent *set* is then to the S.E. above the Equator, curving round the islands and out to the S. and S.W., and chiming in with the Westerly drift of the S.E. Trade. A ship will thus generally make considerable progress to the S.E. by taking every advantage of the shifts of wind; for, in the vicinity of the islands, or within a few degrees of them, the winds hang much from South and S.S.W.: whereas, in the ocean, far to the W., the monsoon will be found to prevail from the S.E., as a ship advances into S. latitude, which will greatly prolong her passage, should she have crossed the Equator far to the Westward.

If bound to Fort Marlborough, it will be prudent to get into the parallel of that place before the islands are approached, then steer in for the coast to the S. of Trieste Island, or betwixt it and Larg, as the winds permit. A ship, bound direct to Sunda Strait, should keep out from the land until she reach the entrance of the strait; here, her progress will generally be more speedy than by keeping near the shore; although a fast-sailing vessel may pass along the coast backward and forward, between Fort Marlborough and Sunda Strait, in either monsoon. Baron Melvill, an officer of the Dutch Royal Navy, in his *Seaman's Guide*, cautions ships not to fall to the E. of Java Head during the strength of the Westerly monsoon, because the W. winds blow with great violence along the S. coast of Java, with strong currents setting to the E., which, by their united strength make it impossible to beat up along this coast.

Ships bound to Sunda Strait from mid-Nov. to mid-March, when the N.W. monsoon prevails to the S. of the Equator, if they leave the Coromandel coast (Madras) should keep a good *clean full* with the N.E. winds, crossing the Equator in lon. 90° E., for in S. latitude they are sure to get Westerly winds and an Easterly set to carry them to Sunda Strait.

Ships departing from Ceylon, in Oct., Nov., March, and April, when N.W. winds are seldom found to prevail *much* in S. latitude, ought to stand off nearly close to the wind, if it blow from the N.E. quarter, and endeavour to make several degrees of Easting before they are forced close to the Equator by the N.E. monsoon, which they will probably experience in Nov. and March, at leaving Ceylon. In Dec., Jan., and Feb., this may not be always necessary, for the N.W. monsoon generally blows strongest in these months to the S. of the Equator, particularly in the latter part of Dec., all Jan., and part of Feb. In these months ships may steer a direct course from the S. or S.E. part of Ceylon, towards the entrance of Sunda Strait; but even at this time it is prudent to stand to the E.S.E. with the N.E. monsoon, until the bay is open, to avoid strong Westerly currents and light winds, likely to prevail in Dec., on the meridian of Ceylon, nearly to the Equator; and in the space comprised between that meridian and the Maldivh Islands. Although the *Anna*, *Briannia*, and other ships, experienced strong westerly currents to the S. of Ceylon in Nov. and Dec., which prolonged their passage, and the former had very light winds, this does not always happen; for the *Bahar* left Cape Comorin on 16th Dec., steered from thence S.S.E., crossed the Equator on the 20th; here she got strong N.W. winds, and made a quick passage to Sunda Strait. The *Sullivan*, several years after, followed the same track as the *Bahar* did, and was equally fortunate.

Ships bound to any of the straits on the E. of Java, ought in the strength of the N.W. monsoon to make the Island Noesa Baron, in order to correct their reckoning; for in Dec. and Jan., the weather is often thick near the S. coast of Java, with strong Westerly winds and E. currents. Should they fall in with that coast farther to the W., and pass along at the distance of 4 or 5 leagues, they will usually have more favourable winds near the shore, than if farther out in the offing.

In Feb., light winds are often experienced in the track between Ceylon and the N.W. end of Sumatra; if, therefore, a ship, after leaving that island, meet with light winds in N. latitude, she should approach the Equator without loss of time, where N.W. and variable winds may generally be expected in Feb. and part of March.

In May and June it is always thought safe to fall in with the land to the E. of Java Head, if bound into Sunda Strait, as the S.E. monsoon generally prevails in these months along the S. coast of Java. Variable and baffling winds, however, have been occasionally experienced, and it is therefore advisable to steer nearly direct for Java Head in most seasons, if bound to the Strait of Sunda, and if the ship's longitude be correctly known, borrowing a little to the E. or W. when it is approached, as may be required by the prevailing wind, or other circumstances at the time. If bound to Bencoolen, a direct course to make Engano will probably be found the most speedy in May, June, and part of July, and from thence direct for Bencoolen, as the winds admit, because in these months the winds are often at N.W., with S. and E. currents.

SHIPS, bound from JAVA HEAD for Bombay, ought to run down their Westing in the S.E. trade, and adopt the Southern route, between the Chagos and Seychelle Islands, from March to Sept. If they approached near the Equator early in April, or in Oct. (when N.W. and Northerly winds prevail in N. latitude at the changing of the monsoons), they may, if the wind incline from the West and N.W., steer to the northward on the E. side of the Maldivh Islands, and endeavour not to fall in with the Malabar coast until past Calicut or Mount Dolly. But if they are several degrees to the westward of the Maldivh Islands when the Equator is approached, the best passage to Bombay may be expected in April, part of Sept. and Oct., by keeping to the W. of the islands, and avoiding the coast. But after mid-Oct., it is well to pass to the Malabar coast round the head of the Maldivhs.

HOMeward PASSAGE FROM INDIA ROUND THE CAPE.

Ships bound from Bombay or the Malabar Coast to Europe will find the most convenient Tracks according to the seasons, laid down on the Passage Charts. In the S.W. monsoon, they should take a departure from Cape Comorin,* and steer onwards to the S.S.E., keeping the Westerly wind *abeam*, or *abaft* the beam, till they meet with the S.E. Trade below the Equator. The more Easting they make, the more fair for them will be the S.E. Trade.

Ships bound from the Red Sea or Gulf of Persia towards the Cape of Good Hope, in the strength of the Northerly monsoon, should proceed through the **Inner Passage**, or Mozambique Channel. Ships from **Bombay** and the N. parts of the **Malabar Coast** may also adopt this passage during the strength of the monsoon, in Dec. and Jan., when Northerly winds may be expected to carry them well into or nearly through the Mozambique Channel. This route, ought not, however, to be chosen either too *early* or too *late* in the season, although it is more direct from Bombay than any other, because Southerly winds prevail greatly in the Mozambique Channel, in Oct. and Nov., and after Feb.; and even in this latter month Southerly winds are often experienced there. Between Nov. and Feb., a strong current setting along the coast of Africa from Cape Delgado to the Southward, has enabled some ships to work through this channel in March and April; but it ought not to be attempted so late in the season, for great delay (*see* page 655) and uncertainty will be occasioned thereby; and as storms are sometimes experienced about the S. parts of the Mozambique Channel, even in Jan. and Feb., many navigators gave the preference to the Outer Passage, to the E. of Rodriguez, and of all other islands in the W. part of the Indian Ocean.

A ship departing from Bombay in Nov. and Dec., intending to proceed by the Inner Passage, should steer to fall in with the island Comoro, giving a proper berth to the Seychelle Islands, and to those that form the N.W. part of the Madagascar Archipelago. She may pass to the W. of Comoro, or through any of the channels between the Comoro Islands, as circumstances require. From hence a direct course through the middle of the Mozambique Channel may be adopted, with a steady Northerly wind; but when it is light or Southerly, she ought to keep within a reasonable distance of the African coast, where a strong current will be found setting to the Southward in her favour, and it may be prudent to pass to the W. of Juan de Nova, the Europa Island, and Bassas de India Rocks, whether the wind be from N. or S. The current generally runs strong to the S.W. round Cape Corientes; for off that Cape the Mozambique current (which only reaches thus far during half the year) is joined by that *constant stream* that flows to the West past the S. end of Madagascar; and, to benefit by the currents to the full extent, it is advisable to pass within sight of Corientes Cape, if the weather be favourable. Afterwards a moderate distance of 4 to 8 or

* Cape Comorin will soon have a light-house, with another near the Crocodile Rock.

10 leagues may be preserved from the coast of Natal, unless the wind begin to blow from the S.E. with a rising sea: in this case it will be proper to haul off to a greater distance from the land.

Whether the route through the Mozambique Channel, or any of those to the E. of Madagascar, have been adopted, it will be advisable to approach within a moderate distance of the coast about Algoa Bay, if it has not previously been seen, farther to the northward; and afterwards it will be proper to keep near, or upon the edge of the bank of soundings, to benefit by the current. A description of the bank of Agulhas, also of the currents, winds and weather in its vicinity, is given under that head, and at page 655. In Feb., March, and the early part of April, when S.E. winds prevail, the best track to preserve the strength of the current, after getting near the land about Algoa Bay, is to keep close along the outer edge of soundings until in about lon. 24° or $23\frac{1}{2}^{\circ}$ E. Here, the direction of the stream begins to change from W.S.W. to the S.W., and soon after to S.S.W. $\frac{1}{2}$ W., for which a proper allowance should be made, by steering more towards the land, and keeping in deep soundings upon the edge of the bank. In the winter months, when N.W. and Westerly gales are frequent, it is advisable to keep in with the coast, which partly shelters ships from the violence of these gales; for, although the Westerly current is strongest at the outer verge of the bank, ships which keep far out are liable to encounter very high seas, and be driven off a great way to southward by N.W. or Northerly gales. From this cause, several ships have been greatly retarded in regaining their position upon or near the verge of the bank, whilst others, by keeping in with the coast, had smooth water at the same time, and got round the Cape five or six days sooner than the former, who parted from them off Algoa Bay. At all times of the year, when the winds incline to blow strong between N.E. and West, it is advisable to borrow upon the bank, towards the coast, or at least to guard against being driven far to the S., where a contrary or eddy-current often sets to the Eastward. It is not thought dangerous to approach the coast of Africa, because the wind is seldom or never known to blow with great violence directly on the shore, so that a ship may always clear it on one tack or the other.

The Cape of Good Hope is frequently the boundary of very opposite kinds of weather; for although to the E. of it the winds and weather may often be found unsettled and threatening, yet no sooner has a ship got round to the W. of this promontory, than the weather generally becomes settled, with a strong and steady wind from the Southward. When abreast of Cape Agulhas with a brisk S.W. or S.S.W. wind, a ship ought to keep well out from the coast, that she may be enabled to pass the Cape of Good Hope at a proper distance without tacking; and this is particularly necessary in the night. The loss of the *Arniston* was occasioned by a want of due caution in this respect, for, by bearing away too soon, in order to round the Cape of Good Hope, she got into Struys Bay, on the E. side of Cape Agulhas. There is now, however, a light on Cape Agulhas, which will be a security against such fatal mistakes. The lead ought not to be neglected, and this, in thick weather, will always point out whether or not you are sufficiently advanced to the W., to bear away with safety round the Cape: for you ought not to bear away until after losing soundings on the W. verge of the Cape Bank; and if soundings are obtained after edging away to the N.W., you ought immediately to haul off from the land. When round the Cape, and having got a moderate distance from the coast by steering about N.W. by N., then a direct course about N.N.W. $\frac{1}{2}$ W., or N.N.W., will be fair for St. Helena.

From St. Helena, homeward bound, some navigators prefer crossing the Equator far to the W., with the view of having steady winds, and avoiding a space of variable airs and calms, which they imagine to prevail betwixt the limits of the N.E. and S.E. Trade, farther to the E. This opinion seems not supported by experience, for some ships, when far to the W., have been detained several days by calm, thick, foggy, wet weather, and a turbulent swell; when others, crossing the Equator in lon. 19° or 20° W., had dry weather and brisker winds, and this has even happened to several ships which passed in sight of the Cape Verde Islands. It is, however, prudent not to cross the Equator far to the E., to avoid light winds and calms, which often prevail in the vicinity of the coast of Guinea. The prevailing winds about the Equator have been exhibited in a tabular form, in the Second Section of this work, where the routes of homeward-bound ships will be found, with subsequent directions for ships passing the Equator when bound outward. Departing from St. Helena for Europe, a direct course may be steered for Ascension Island, which is about N.W. by N.; and in this part of the passage, a steady S.E. Trade generally prevails all the year, with a Westerly drift. Ascension may be passed on either side, at any convenient distance, but ships commonly pass to the Westward of it, from 3 to 10 or 12 leagues' distance. From the Island Ascension, steer N.N.W., or N. by W. $\frac{1}{2}$ W. towards the Equator, which ought not to be crossed to the Eastward of lon. 18° or 19° W., nor to the Westward of lon. 24° or 25° W.

STEAMER TRACKS FROM SUNDA STRAIT TO RED SEA.

When writing of the Chagos Archipelago we have advocated the establishment of a Coaling Depôt and Light-house at Diego Garcia. This group, which belongs to Great Britain, and is subordinate to Mauritius, has in **Diego Garcia an admirable central post in the Indian Ocean**; and, with facilities for coaling there, the Mail Steamers from South Australia and Melbourne may (especially during the prevalence of the S.W. monsoon, in the Arabian Sea) greatly expedite their homeward journey, stealing a march of fully *five days* upon those which (as the P. and O. steamers now do) run to leeward at that season to coal at Point de Galle.

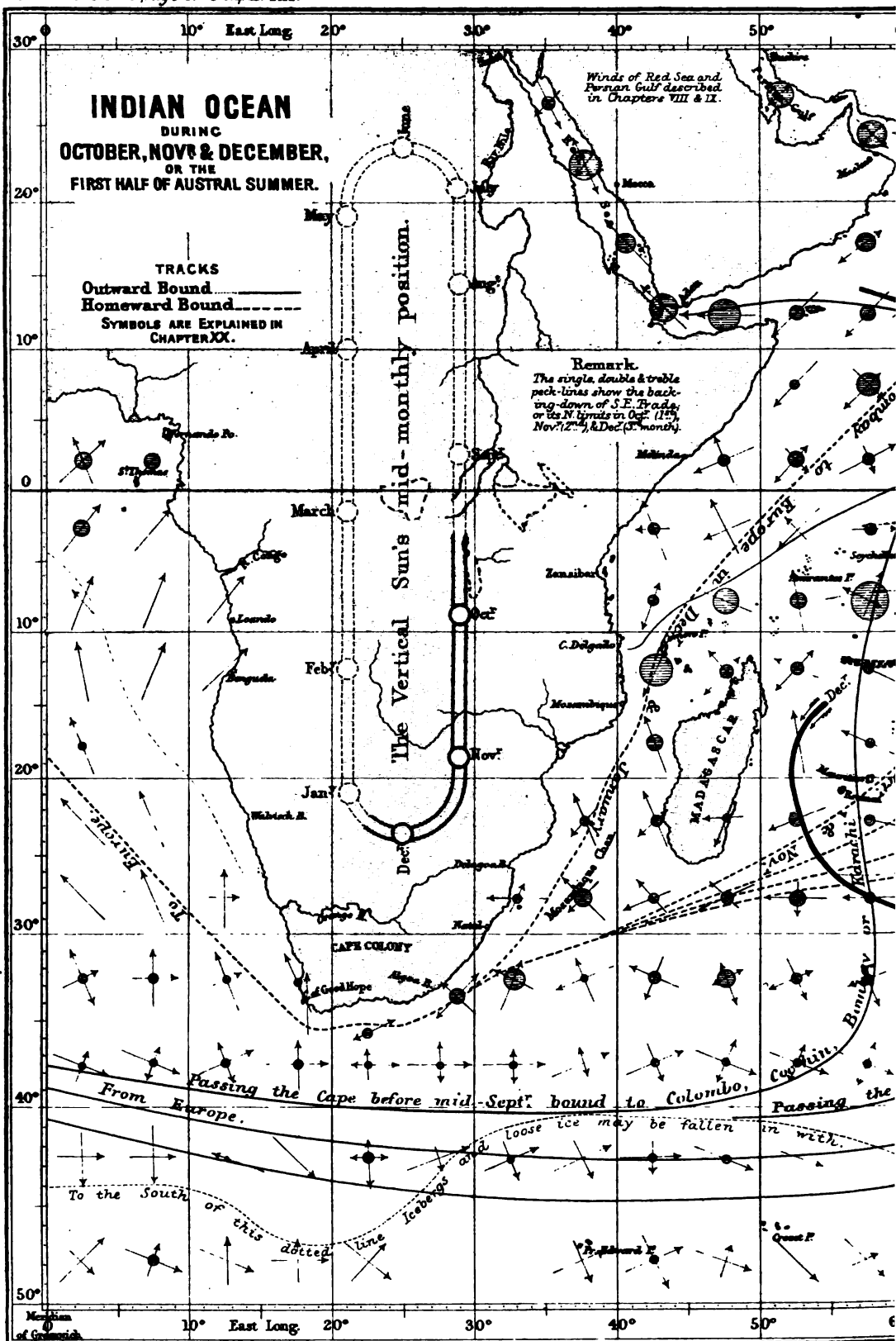
The Sunda Strait at the same season possesses advantages in affording a shorter cut from the China Seas to the Red Sea; and I am convinced that the steam clippers with the new season's teas, leaving China from mid-May to end of August, by coming through Sunda Strait (whence they have a fair fresh wind to Cape Guardafui) will gain no less than **two** or even **three days** upon those which adopt the Malacca Strait and which emerging thence must, under great disadvantages, proceed to hammer against the full strength of the S.W. monsoon.

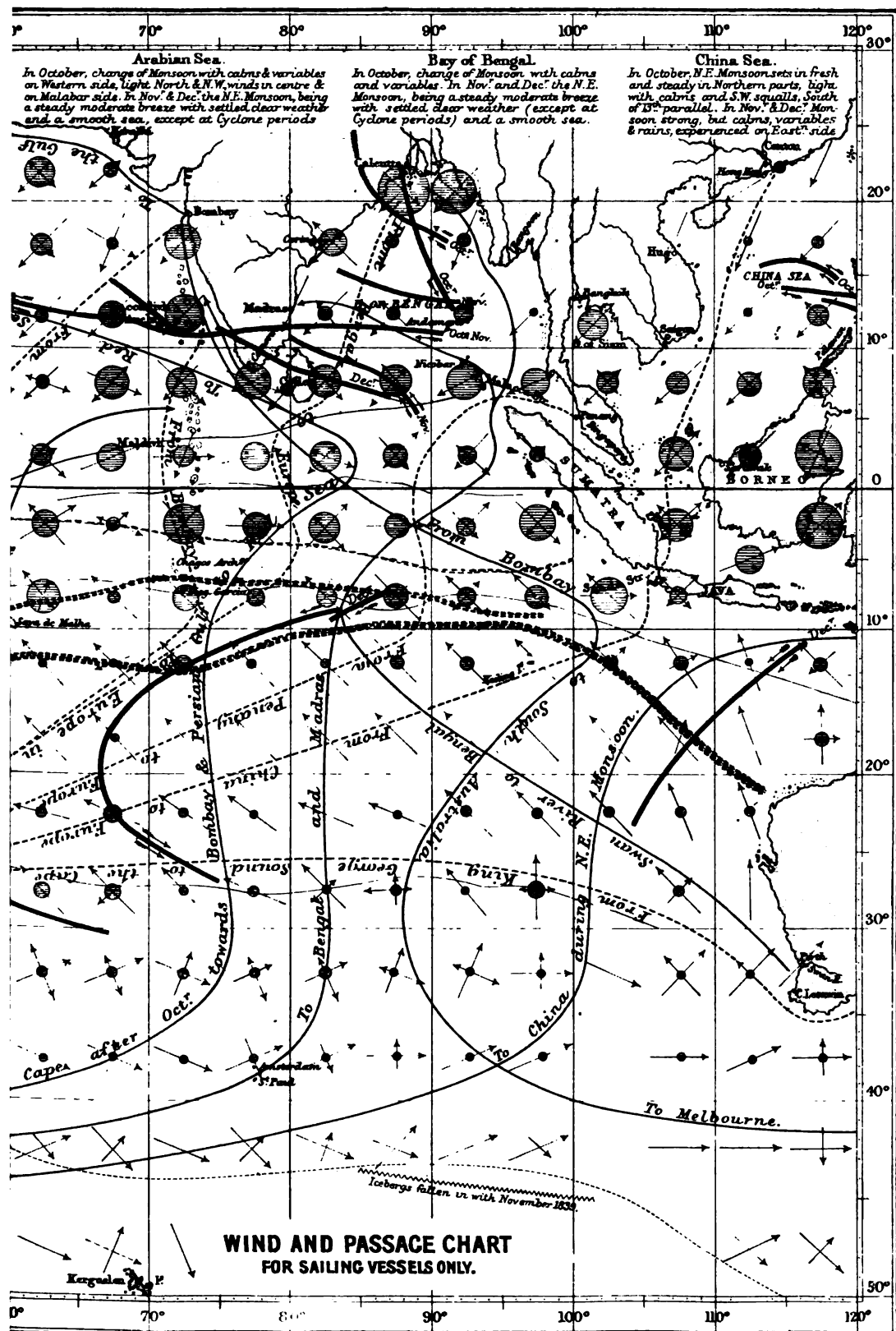
The two Charts showing Steamer Tracks in opposite monsoons, as they also exhibit the surface currents of that Ocean, will explain at a glance the reason of our advocacy of several *new* routes. These Drift-Currents are a product of the winds in their seasons; and where (in the Indian Ocean of which we are now speaking) they run across the wind, it will be found that the cause of their deflection is some natural submarine obstacle. On the chart for the S.W. monsoon we have laid down the **New Tea Steamer Track** from Sunda Strait to the Red Sea; this has the great advantage of fair winds and no adverse currents from that Strait to Guardafui Cape. A fast steamer, carrying 20 days coal, might by working expansively under steam, and with a good spread of canvas, easily make the run from Batavia to Aden without coaling. But with a Coal Depôt at Diego Garcia the slowest steamer might make sure of a safe and speedy passage.

The new line of steamers—established to convey a four-weekly mail between England and East Australia, viâ Singapore, Java, and Torres Strait—might confer a great benefit upon the colonists by despatching the homeward mails by special steamer from Batavia direct through Sunda Strait to Aden, between May and Sept. Thus **an entire week** might be gained over such steamers as pass through the Malacca Strait and coal again at Point de Galle, whence they must hammer against the S.W. monsoon. Everybody must have an interest in the rapid transit of mails, and a departure from beaten tracks (during one-third of the year) is surely justifiable, if a gain of 7 days may be effected.

Heavily laden steamers from Bengal, Chittagong, and Burmah, would also do well in the S.W. monsoon to run down the Bay on the E. side of the Andamans and Nicobars; from Acheen Head, steering to the S.W. till they get the S.E. Trade, a fair wind to Diego Garcia. Coaling at that island, they may carry enough fuel to pass by Aden and reach Suez. The custom now in vogue is to face the monsoon down the Bay of Bengal, and then to coal at Point de Galle. From that place they again hammer against the monsoon to get into the One-and-a-half-Degree or the Equatorial Channels. Then they make Westing under steam alone; but although, in the vicinity of the Equator, they can hold the belt of moderate winds, the currents are there very strong against them. from 50 to 70 m. a day; whereas, between Sunda Strait and the Seychelles the currents are Westerly, averaging 20 m. a day in favour of a homeward bound vessel throughout the months of June, July, Aug. and Sept.







**WIND AND PASSAGE CHART
 FOR SAILING VESSELS ONLY.**

INDEX TO VOLUME I.

Places in this Index marked with * have their Latitudes and Longitudes given; those marked with † have their Longitudes only; those marked ‡ have Latitudes only.

Abbreviations.—B. Bay—Bk. Bank—C. Coast—Ca. Cape—Ch. Channel—Ft. Fort—G. Gulf—H. Harbour—Hd. Head—I. Island—Is. Islands—Jeb. Jebel—Lt. Light—Mt. Mount or Mountain—Oc. Ocean—P. Port—Pk. Peak—Pt. Point—R. River—Rd. Road—Rf. Reef or Reefs—Rk. Rock—S. Sea—Sd. Sound—Sh. Shoal—St. Strait—T. Town—Vil. Village—N. North—S. South—E. East—W. West.

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